The New England
Journal of Medicine

VOLUME 213 AUGUST 15, 1935 NUMBER 7

VOLVULUS OF THE CECUM

Acute and Chronic With Reports of Eight Cases

BY RICHARD H. SWEET, M.D.*

VOLVULUS of the cecum as one of the causes of acute intestinal obstruction has been recognized for many years. According to Faltin, the first case report was by Rokitansky in 1841, but no thorough consideration of the subject appeared until Zoege Manteuffel in 1898 published the first study of the condition. Since then many articles have appeared, most of them presenting case reports and several giving thorough discussions of the etiology, symptomatology, and treatment. In all, several hundred cases have been reported, mostly in the foreign literature. In the experience of a single surgeon, however, cases of volvulus of the cecum must be relatively rare. The truth of this assumption is suggested by the fact, in the first place, that there appear in the records of the Massachusetts General Hospital (not including the author's two cases here reported) only six cases of volvulus of the cecum. Secondly, of these only two were operated upon by one surgeon, the other four having been treated by four different operators.

All of these cases and in fact almost all of those reported in the literature were of the acute type with total obstruction of the bowel and its attendant acute symptoms necessitating emergency surgery. There is, however, a type of subacute or chronic partial volvulus of the cecum which has been discussed by others, notably Jacobsen and Twyman, and which is illustrated by one of the cases to be presented here. It is because of this relative rarity of the disorder and especially because of the opportunity to present for comparison two cases representing the two clinical types that this report is submitted.

ACUTE VOLVULUS OF THE CECUM

The diagnosis of volvulus of the cecum is rarely made before operation or autopsy. As a result of this, many cases of partial volvulus producing transient attacks of complete obstruction with quick spontaneous relief occur without recognition. This fact is amply borne out by reviewing the reported case histories, many of which give evidence of repeated less severe attacks over varying periods of time before the serious total obstruction which brings the patient to operation or the autopsy table. The result of this is an abundant knowledge of the acute, severe, emergency cases and relatively little knowledge of the chronic recurring type.

As a cause of acute intestinal obstruction, volvulus of the cecum is undoubtedly relatively infrequent. The American writers, Pratt and Fallis state that volvulus of the cecum makes up 5 to 6 per cent of all cases of intestinal obstruction, but this figure seems unduly high. For example: at the Massachusetts General Hospital from 1873 to 1930 there were 520 cases of acute intestinal obstruction exclusive of those resulting from strangulated external herniae. Of these, six were due to volvulus of the cecum. This means that out of all cases of obstruction not including strangulated herniae 1.15 per cent were due to volvulus of the cecum. In marked contrast European writers on the subject almost uniformly quote much higher percentages. For example: Jacobsen out of fifty-three cases of acute ileus, exclusive of herniae, finds volvulus to be the cause in 36 per cent. And of these 36 per cent due to volvulus the distribution of cases according to the portion of the intestine involved was as follows:

Volvulus of the cecum 42 per cent of all cases of volvulus.
Volvulus of the sigmoid 11 per cent of all cases of volvulus.
Volvulus of small gut 47 per cent of all cases of volvulus.

In other words, according to Jacobsen, volvulus of the cecum is the cause of 11.6 per cent of all cases of acute intestinal obstruction exclusive of strangulated external herniae as opposed to 1.15 per cent in the Massachusetts General Hospital series.

Analyzing the Massachusetts General Hospital cases in the same way one finds that of 520 cases of acute intestinal obstruction exclusive of strangulated external herniae there were fifty-three cases of volvulus and of these there were:

Volvulus of the cecum 6 cases
11.3 per cent of all cases of volvulus
Volvulus of the sigmoid 10 cases
18.8 per cent of all cases of volvulus
Volvulus of the small gut 36 cases
67.9 per cent of all cases of volvulus

Although volvulus of the cecum seems to be

*Sweet, Richard H.—Assistant Surgeon, Massachusetts General Hospital, and Palmer Memorial Hospital, Boston. For record and address of author see "This Week's Issue," page 332.

rather a common cause of intestinal obstruction in Europe it would seem that in this country as suggested by the series here presented it is an infrequent occurrence and that furthermore it is the least common form of volvulus.

In the card index of the records of the Massachusetts General Hospital which extends as far back as 1873, there appear six proved cases of acute intestinal obstruction resulting from volvulus of the cecum. To these a seventh is added here, making in all only seven cases during a period of fifty-seven years in a large hospital clinic. Brief reports of these cases are as follows:

CASE 1. E. J. A. Aged forty-eight years, married, colored laundress.

Admitted October 18, 1906.

Present Illness: Two days before entry the patient was seized with generalized colicky pain in the abdomen followed by diarrhea and bloody stools. She vomited once. On the day of admission the pain became localized in the right lower quadrant and opposite the umbilicus where it was quite severe.

Physical Examination: Temperature 98.6°; pulse 96. The tongue was moist but coated. The abdomen was distended and tympanitic everywhere. Every few minutes a mass became visible in the right lower quadrant (4 x 3 inches in diameter). This mass was tympanitic on percussion. There was visible peristalsis accompanied by severe pain.

Past History: During the past ten years she had had frequent attacks of abdominal pain with constipation followed by diarrhea and the passage of blood and mucus. These attacks occurred at intervals of one or two months and lasted about two days.

Operation: Ether anesthesia.

"A left rectus incision was made. A much distended purple colored loop of intestine presented. Exploration showed this to be the cecum which had a very long mesentery. The lower end lay against the spleen. The entire cecum was twisted upon itself. The cecum and terminal ileum were resected and a Mixter tube was inserted in each end of the bowel and these brought out through the wound. The wound was drained. Condition at the end of operation poor."

Course: The patient died on the evening of the fifth day of what appears from the text of the record to have been peritonitis.

CASE 2. S. B. B. Aged sixty-two years, male, white, married "filer".

Admitted December, 1908.

Present Illness: There was no antecedent history preceding three days before entry when he began with sharp abdominal pain, recurring ever since and associated with vomiting. His bowels failed to move in spite of several enemata. The pain was severe enough to require morphine.

Physical Examination: The patient lay in bed with knees drawn up. His tongue was dry and coated, his breath foul. The abdomen was tympanitic everywhere with asymmetrical right-sided meteorism; no mass was felt. Tenderness was evident on pressing over the right side of the abdomen.

Operation: Ether anesthesia, median incision.

There was a small amount of clear fluid. There was a portion of large bowel presenting which was distended and reddened, the diameter being about three and one-half inches. This was found to be the cecum which had undergone a volvulus of two and one-half turns. Detorsion of the cecum was done and a Mixter tube cecostomy was performed through a right lower quadrant stab wound. A large amount of gas and fluid was evacuated.

Course: There was a good recovery, but the patient died on the sixteenth day of pulmonary embolism.

Autopsy: A fibroma of the colon was found at the point where the volvulus occurred. The cause of death was pulmonary embolus.

CASE 3. M. R. Aged forty-eight years, female, white housewife.

Admitted in 1911.

Past History: (1) In 1907 the patient was operated upon for acute intestinal obstruction for which an enterostomy was done and a Mixter tube put into the sigmoid which was found to be twisted. (2) In 1908 an exploratory laparotomy was done and a volvulus of the sigmoid found. This was corrected and a colostomy done. (3) Three months later the colostomy was closed.

Present Illness: The patient had not had a bowel movement for five days before entry. The night before entry she had severe abdominal cramps. Glycerine and turpentine enemata were given without result. Next morning she was seen at the Out-Patient Department where she was given a dose of magnesium sulphate solution (oz. 1½). Six hours later she was brought into the hospital in collapse.

Physical Examination: There was marked tympanitic distention of the abdomen. Temperature 97.6°, pulse 88. An enema was given without results.

Operation: Ether anesthesia.

The cecum was found to be distended and "as large as a fire hose." A cecostomy was done using a Mixter tube which was brought out through a lateral stab wound.

Course: The patient recovered but continued to evacuate her bowels by cecostomy only. Six weeks later a second operation was done and the terminal ileum was sutured to the sigmoid and the ends of the isolated colon between the ileum and the ileocolostomy, were brought out through the abdominal wall. The patient recovered and was discharged with bowel function restored to the normal channel but with two intestinal fistulae from the isolated loop of colon. Nothing appears in the record about the final outcome of this case.

CASE 4. Male, aged 48 years, white shipper.

Admitted in 1911.

Present Illness: There was a history of four days' duration beginning with griping abdominal pains which continued. On the evening before entry he vomited. There had been frequent hiccoughs. His bowels had not moved since the onset of pain.

Physical Examination: The patient appeared quite ill and was suffering from severe pain. The abdomen was greatly distended; peristalsis was audible; no masses were felt.

Operation: Median incision.

Blood-tinged fluid was found on opening the peritoneum. A large distended cecum "the size of a musk melon" was discovered in the epigastric region. This was delivered through the wound and found to be twisted one-half turn on itself. The cecal mesentery was long. The peritoneal coat of the cecum was found to be split in several places. A cecostomy was performed using a Mixter tube. The wound was drained.

Course: The patient recovered but required a secondary operation to close the cecostomy. A note dated 1915, four years after operation, states that the patient was alive and well and had not had a recurrence.

CASE 5. Female, aged seventy-one years, white.

Admitted in 1913.

Present Illness: The patient had not had a bowel movement for seven days preceding entry but had experienced severe colicky pain at intervals. She vomited all day the day before admission. Enemas failed to produce results.

Physical Examination: The patient was emaciated. The abdomen was tensely distended and tympanitic. A large mass was felt in the right side. Visible coils of intestine were evident.

Operation: Local and "Anesthol". Left rectus incision.

A much distended and dilated cecum was found; the entire cecum and ascending colon were freely movable on a long mesentery. There was a complete turn upon itself of the ascending colon near the hepatic flexure. On the internal surface of the cecum was an area of gangrene. This area was infolded, the cecum was untwisted, and a cecostomy was done with a Mixter tube. The cecum contained half a basinful of liquid contents and much gas.

Course: She was discharged on the seventeenth day with the cecostomy closed. One year later the patient was reported to have died suddenly, apparently of other causes.

CASE 6. Female, white, unmarried, feeble-minded.

Present Illness: The patient ate heavily at a party the day preceding entry. At night she was nauseated and vomited. Next day she became much distended and began to have generalized abdominal pain. Enemata were given without result.

Physical Examination: The abdomen was enormously distended, more so in the right lower quadrant than elsewhere. A large mass was felt in the right lower quadrant.

Operation: The cecum and ascending colon were enormously distended, occupying the entire right half of the abdomen. It was found to be twisted one complete turn at the hepatic flexure and was black and gangrenous. There was cloudy malodorous fluid in the abdomen. The cecum was untwisted and then excised. The open ends of the colon and ileum were brought out through the wound and a tube fastened in each.

Course: The patient died at the end of twenty-four hours.

Autopsy: Streptococcus and B. Coli were cultivated from the blood. There was a terminal bronchopneumonia. Examination of the cecum and ascending colon showed gangrene and infarction.

CASE 7. W. B. C., B. M. 1358, October 4-28, 1930.

A married salesman, aged forty-seven years.

Present Illness: Two days before entry the illness began with colicky pain in the lower abdomen. It became quite severe and was accompanied by nausea. He slept little that night. The day before entry he vomited. The pain continued until admission to the hospital. Enemas produced a little gas and some fecal result.

Past History: Twelve years ago he had a strangulated left inguinal hernia, operated upon, which recurred five months ago. At that time he was operated on for what he thought was diverticulosis of the colon and had the hernia repaired again. At this time he is said to have had a cecopexy done. Since then he had had four attacks similar to the present one which subsided after a few days. He has always had some degree of indigestion and gas in the intestines.

Physical Examination: The patient was a fairly well-developed and poorly nourished man of middle age. On admission he was sick-looking and drowsy. His temperature was 98°F., pulse 96. This later rose to 110. Respirations were 20. The blood pressure was 160/100. *Abdomen:* There were lower mid-line and left groin incisions of previous operations. The abdomen was immensely distended, more on the right than on the left. Peristalsis was visible and audible.

Preoperative Diagnosis: Acute intestinal obstruction.

Postoperative Diagnosis: Acute intestinal obstruction and volvulus of the cecum.

Operation: Spinal anesthesia.

The abdomen was opened through the previous operative scar medial to the left rectus muscle. On opening the peritoneum a large very much distended portion of the large intestine presented. This was found to be cecum which because of an anatomical anomaly was not attached to the posterior abdominal wall and was fully one foot in length. It was tremendously dilated with a diameter of at least six inches. It was found to be completely rotated with a point of kink in the ascending colon well above the ileocecal valve. This volvulus had carried the terminal ileum around underneath and at about twelve inches from the ileocecal valve the ileum was adherent. A two inch segment of the ileum at this point was very badly damaged and dark purplish in color. When the volvulus was reduced the contents of the cecum emptied into the ascending colon. A small right rectus incision was made and a cecostomy done at this point using a large rubber tube. The median incision was then closed without doing anything to the damaged ileum as it was judged to be viable.

Postoperative Course: The patient withstood the operation well and recovery was uncomplicated. During the first 24 hours the drainage from the cecostomy tube was 74 ounces; the day following it was 36 ounces; from then on it gradually decreased in amount to about 15 ounces in 24 hours. He remained in the hospital three weeks, at the end of which time his wounds were well healed save for a small granulating area in the cecostomy wound. His bowels were moving normally. There was no fecal drainage from the cecostomy wound.

Subsequent Course: The patient has been seen on an average of twice a year since operation. He has not had any attacks of abdominal pain, but has rumbling of gas in the abdomen after eating certain foods or after eating a large meal. His bowels move regularly. He states that in general his abdomen feels more comfortable than it ever has before.

DISCUSSION

Anatomical Considerations: All modern writers on the subject have emphasized the fact that volvulus of the cecum occurs only in cases where there is a congenital lack of fixation of the organ including, in many cases, the ascending colon. A long mesentery is often found, but in many cases the cecum itself is almost devoid of any attachment.

Certain statistical studies have been made of the occurrence of a long mesentery and unattached cecum. V. Thun for example found 19 per cent of cases out of 388 cadavers where the cecal mesentery was long enough to allow the occurrence of volvulus. Wandel reported the same condition in 10 per cent of 600 cadavers.

The twist in the bowel always occurs at a point of fixation below which the bowel is unattached. This is often at the hepatic flexure but may be at any level in the ascending colon.

Occasionally the terminal ileum is adherent posteriorly and serves as a fixed point below which the cecum rotates. In one of the Massachusetts General Hospital cases (Case 2) the volvulus occurred at the point of attachment of a tumor, said to be a fibroma of the colon. Below this the bowel had rotated. In the majority of instances where the direction of rotation was stated it has been described as clockwise. This was true in the author's case, but no mention of the direction of the twist was found in the remaining six Massachusetts General Hospital cases. One exception to this assertion is a case reported by Littlewood in 1899, who found a counter-clockwise rotation of the cecum. Furthermore, Jacobsen says in his series of 20 cases the direction of the twist was equally right or left, and DuRoux also says that both types of rotation are to be found. The degree of rotation is of importance. It is apparent that a complete half-turn (or 180 degrees rotation) must take place before complete obstruction can result. Many cases, however, manifest a greater degree of rotation than this and one often finds it described as a "complete turn" or even more, as occurred in Case 2 of this series, where there were two and one-half turns. Obviously in such extreme degrees of torsion the arterial supply to the twisted bowel is usually much diminished or often completely shut off, as a result of which necrosis and gangrene inevitably follow. It is in the latter group of patients that mortality is most likely to occur and, as will be seen, especially in case an excision or resection of the cecum has been performed. Table I gives a summary of the anatomical data available in the present series.

Inciting Causes: Although the primary cause of volvulus of the cecum is the absence of fixation of this organ, there are often other causes which induce the acute attacks. Overeating is generally admitted to be an inciting cause as perhaps occurred in Case 6 of this series. Many European writers have stressed this point. At any rate, distention of the cecum with feces or gas may cause it to flop over below some point of abnormal fixation, thus starting a volvulus. Once the blood supply begins to be shut off, the bacterial activity may increase and lead to further distention and increase of obstruction as pointed out by Homans. The importance of overindulgence in food is said to be enhanced when followed by vigorous exercise as pointed out by Pratt and Fallis and others. It is conceivable that with the cecum overdistended a sudden exertion or twist of the body might induce a volvulus. Ohman believed that volvulus of the cecum occurs more frequently among people who subsist on a coarse diet with a high roughage content such as is consumed by some of the European peasant classes. DuRoux was of the same opinion and states that this form of volvulus is very common in Russia, Finland, Poland, and Scandinavia where a coarse vegetable dietary is widely used.

Another occasional inciting cause appears to be the vigorous peristalsis which results from the use of certain drastic purgatives as Corner and Sargent emphasize. Further inciting causes mentioned by Jacobsen are the pressure of an enlarging pregnant or parturient uterus, violent coughing, diarrhea from any cause, and incarceration of a dilated cecum in a hernia, especially the umbilical type.

Diagnosis: A diagnosis of acute volvulus of the cecum has rarely been made before operation. The clinical manifestations are those of intestinal obstruction without any further char-

TABLE I

Case No.	1	2	3	4	5	6	7
Location of cecum	Upper abdomen to L. U. Q.	—	—	Epigastric region	—	Entire right side of abdomen	Mid-abdomen
Size of cecum	Much distended	Diameter 3½ in.	Size of fire hose	Large as musk melon	Much distended and dilated	Enormously distended	6 x 12 in.
Long mesentery with cecum not fixed	+	+	?	+	++	+	+
Degree of twist	?	2½ turns	?	180°	360°	360°	360°
Direction of twist	?	?	?	?	?	?	Clockwise
Serious damage to blood supply	+	?+	?	+	+	+	+
Definite gangrene	+	0	?	?	Small area	+	0

acteristic signs except, perhaps, localized abdominal distention in the right half of the abdomen or the presence of a large tympanitic mass in this region which might suggest a distended cecum.

Treatment: Immediate operation is obviously indicated in these cases. Temporizing with enemata and symptomatic treatment are now inexcusable relics of the past. Although the need for operation is always urgent, if one finds an elevation of the white count indicating, as it does in all cases of strangulation of the bowel, damage to its blood supply, the necessity for immediate operation is manifest in order to prevent inevitable development of gangrene of the bowel.

The choice of operative procedure, of course, depends upon the extent of damage to the cecum and the experience and skill of the operator. Extirpation of the cecum for gangrene has been followed by a high mortality. Of the seven cases presented above, two were subjected to excision leaving the cut ends of the bowel in the wound, and both died. Jacobsen states that the mortality of resection in these cases is 50 per cent or more. There is no doubt that the relative number of cases demanding excision because of severe damage to the blood supply and resulting gangrene is small. In general the simplest procedure which will relieve the obstruction, reduce the tension in the damaged cecum, release the compression of the blood supply, and if possible tend to prevent a recurrence of the condition should obviously be chosen. These indications are best met by the operation of detorsion of the cecum followed by a cecostomy. After having determined the direction of rotation, it is simple enough to untwist the bowel, thus releasing the compressed mesenteric vessels and partially emptying the cecum into the remainder of the colon. If one then performs a cecostomy, the contents of the damaged bowel can be thoroughly evacuated and the recurrence of distention prevented while it is healing. What is very important also is the fixation of the cecum to the anterior abdominal wall, which inevitably results from the cecostomy and which tends to prevent a recurrence of the volvulus. The mortality of this operation is low, 17 per cent in Jacobsen's series as compared with 50 per cent for the operation of resection. No doubt by earlier diagnosis and early operation this could be materially reduced. It has been found by many surgeons who have reported on their end results that no further cecopexy is necessary. A summary of the types of operation performed and the results obtained in this series is given in the following table:

TABLE II

Case No.	1	2	3	4	5	6	7
Excision—ends of bowel brought out	+					+	
Detorsion and cecostomy		+		+	+		+
Cecostomy alone			+				
Died in hospital	+	+				+	
Cause of death	Peritonitis	Pulmonary embolus				Streptococcus Septicemia Bronchopneumonia	
Recurred	—	—		0 in 4 yrs.	0 in year she lived	—	0 3 yrs.

Both cases where the cecum was excised died (operative mortality of 100 per cent). One of the four cases where detorsion and cecostomy were performed ended fatally (a mortality of 25 per cent). Satisfactory follow-up reports are available in four of the seven cases and in all of these there was no recurrence. The last remaining patient of the group (Case 7) reports that he is in better health than ever before. So far as immediate recovery and subsequent course are concerned, the best results, therefore, resulted from detorsion and cecostomy, which has been the experience of all who have reported on this condition.

CHRONIC RECURRING VOLVULUS OF THE CECUM WITH SUBACUTE OBSTRUCTION

Undoubtedly many patients with a cecum mobile suffer from recurring transitory attacks of partial volvulus producing pain in the side and perhaps accompanied by vomiting. Spontaneous correction of the volvulus quickly terminates the attack. That this is true is suggested by the history given by many patients of acute attacks over a period of many years preceding a severe acute volvulus with persistent obstruction requiring emergency operation. Corner and Sargent conclude from a study of fifty-seven cases from the literature that there are acute, subacute, and chronic types of volvulus of the cecum. That recurring chronic or subacute volvulus may occur is demonstrated by the following case report:

E. W., student nurse, No. 303726, aged nineteen.
Chief Complaint: Intermittent right lower quadrant pain with nausea.

Present Illness: Three months previously the patient was operated upon by Dr. Arthur W. Allen for acute appendicitis. At that time it was noticed that she had a long mobile unattached cecum. In the presence of an inflamed appendix it was not plicated and a simple appendectomy was done. Her recovery was complicated by an unusual amount of gaseous distention during the first few days. Soon after she began to get about, she had attacks of cramp-like pain in the right lower quadrant which at first were not very frequent and for several weeks occurred only while she was in the upright posture, never while lying down. She returned to duty after a month of rest at home, but continued to have the attacks of pain and nausea even after attempts to control her constipation with diet and laxatives. (Her bowels had been constipated since operation.) The pain became more severe and finally the attacks began to occur even at night while in bed. Defecation failed to relieve them. They lasted usually a few hours and in the interval she remained free from pain.

Physical Examination: Nothing abnormal could be determined by palpation and inspection of the abdomen. The appendix scar was well healed, flexible, and non-tender.

X-ray: A barium enema was reported as follows: "Barium passed without difficulty to the cecum. The colon was rather low in position. On the inner border of the cecum just above the entrance of the ileum there was a rather deep indentation. On defecation the lower part of the cecum emptied normally. The changes are slight; but are somewhat suggestive of an adhesive band across the inner portion of the cecum."

The case was discussed with Dr. Allen who, because he was about to start on a journey, requested the author to do the second operation.

Operation: *Preoperative Diagnosis:* Partial obstruction of the cecum from adhesive band.

Postoperative Diagnosis: Intermittent volvulus of the cecum, cecum mobile, congenital anomaly of the ileum.

The abdomen was opened through a right paramedian incision close to the previous scar. Several filmy adhesions of the omentum to the old scar were found. The cecum was found to be freely movable, without attachment to the posterior abdominal wall. There were no adhesions to the point where the appendix had been removed. The cecum was found to be rotated one half turn to the left in a clockwise direction and the terminal ileum appeared to be coming off of the right side instead of the left. The last six inches of terminal ileum was firmly adherent at the point where the cecum should be. At about the middle of the ascending colon the cecum had flopped over the right colic artery which was short and tense enough to produce a shelf on the posterior abdominal wall. The ileum was freed up and the cecum was plicated and sutured to the denuded area left after freeing up the adherent ileum. In doing this the rotation of the cecum was corrected and when the abdomen was left the ileum lay in its normal relation to the cecum. By plication the cecum had been shortened to about its normal length. The adhesions of the ileum appeared to be congenital in origin.

Course: The convalescence was uneventful except for the development of tetany. This was thought to be the result of a low vitamin diet for several weeks preceding operation, and alkalosis resulting from hyperventilation of the lungs produced by discomfort from the operation (overbreathing).

Subsequent Course: The patient has been seen at frequent intervals since operation and has always been perfectly well. She has not had any recurrence of her former attacks. Her bowels move regularly.

The following is a diagram made shortly after operation in an attempt to illustrate the condition found:

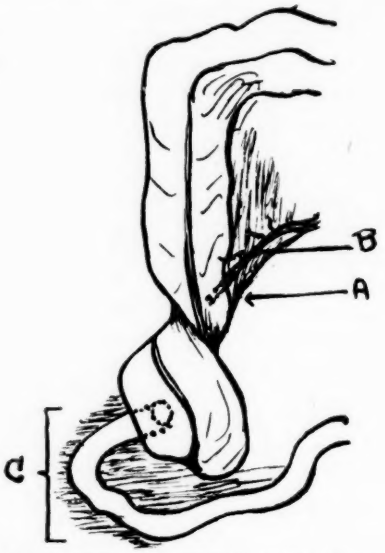

FIGURE I. Diagram to illustrate torsion of cecum in case of chronic volvulus of the cecum.
A—fixed point.
B—right colic artery.
C—area of fixation of ileum.

In this case one sees an example of the influence of fixation of the terminal ileum in the right iliac fossa in facilitating volvulus of the cecum by acting as a fixed point. The importance of this condition is stressed by Corner and Sargent in their article on volvulus of the cecum where they state that a shortened fixed mesentery of the terminal ileum is the commonest cause of cecal volvulus in patients with a mobile unattached cecum. There was also in this patient a fixed point at the termination of the right colic artery which acted as a hinge upon which the cecum could turn. Correction of the abnormality of the ileum and fixation of the cecum sufficed to prevent a recurrence of the volvulus in this case.

*SUMMARY AND CONCLUSIONS

(1) Two types of clinical picture may result from volvulus of the cecum. The acute type with acute intestinal obstruction is that which is best known because of the obvious necessity for operation in such cases. The chronic or subacute recurring type is little known and undoubtedly rarely recognized. Seven cases of the former type and one of the latter type are reported here.

(2) There is always a congenital lack of fixation of the cecum with a point of attachment below which the bowel rotates. The variations of the factors and the effects of various precipitating causes at work have been discussed.

(3) The diagnosis is rarely made before op-

*I have been called upon recently to perform a resection of the "pre-sacral nerve" for the relief of severe dysmenorrhea in this patient: (E. W. No. 303726). At this operation the cecum was found to be of normal size and still well fixed in its proper position.

eration. In the acute type the clinical picture is that of acute intestinal obstruction. The one characteristic suggestive sign is right-sided localized distention. In the chronic recurring type the history may suggest the diagnosis and the x-ray may lend aid.

(4) Treatment in the acute type is immediate surgery directed toward relief of the obstruction, correction of the volvulus, and if possible prevention of a recurrence. These indications are best met by the operation of detorsion of the cecum followed by a cecostomy.

(5) Treatment in the chronic recurring type is directed toward correction of deformity and prevention of recurrence. This of necessity varies depending upon the conditions found, but some method of cecal fixation must be employed.

(6) The results of surgery are good excepting when resection or excision is practiced in the acute cases, when the probable mortality is in the neighborhood of 50 per cent.

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SUBPHRENIC ABSCESS*

BY RICHARD H. OVERHOLT, M.D.,† AND JOSEPH C. DONCHESS, M.D.†

AN inflammatory process with accumulation of purulent material in the subphrenic space, represents one of the serious complications of abdominal disease. Several factors operate to increase the dangers of an involvement of this region of the peritoneal cavity. The primary disease which served to act as the source of the intra-abdominal infection often complicates the picture. Marked generalized sepsis or extension of the process may occur before a diagnosis is made. The close proximity of the liver and pleural cavity to the subdiaphragmatic space make this location for infection hazardous. The pressure changes below the diaphragm and motion of the boundaries of this region incidental to the mechanics of respiration obviously influence the progress and healing of an infectious process in this area. The technical problems involved in establishing and maintaining drainage of this area also add to the gravity of the situation.

Fortunately, in the average individual surgical practice, subphrenic abscess is not often encountered. The less frequent the occurrence of any complication, the greater the chances of its not being recognized early. With subphrenic abscess, however, one should always be conscious of its possible development and seriousness. The mortality in untreated cases approximates one hundred per cent. In treated cases, the death rate varies with the promptness of recognition and the adequacy of surgical management. A review of twenty-five cases treated in the Lahey Clinic in the past fourteen years has been made. It is the purpose of this paper to emphasize certain aspects of the diagnosis and management of this complication.

HISTORICAL

The clinical signs and symptoms of subphrenic abscess as described by Barlow[1] of England as early as 1845 and later by von Leyden[2] of Germany have not been greatly added to by any author up to the present day. Barnard[3] in 1908, very clearly illustrated the subphrenic spaces and the pathways of infection of these spaces. More recently, Fifield and Love[4], Elkin[5], Beye[6], and Ochsner and Graves[7] have written extensive reviews of the subject. Beye called attention to the chest findings which are associated with subphrenic abscess. Ochsner and Graves in a most complete review of the literature found 3,322 reported cases and included fifty cases of their own. Von Volkman[8] in 1879 performed the first operation for subphrenic abscess. Trendelenburg[9] introduced the transpleural approach in the surgical drainage of this area. Technical problems in operating for subphrenic abscess have been presented by many authors. Recently Ochsner[10] has pointed out certain advantages of the retroperitoneal approach to establish drainage by a one-stage operation.

ETIOLOGY AND PATHWAYS OF SPREAD

Subphrenic abscess is in itself a complication of a preëxisting disease process in the abdomen. Once an infection has been set up or introduced into the peritoneal cavity, its spread and localization beneath the diaphragm are determined by the peritoneal reflexions and attachments, by the position of the patient, and is influenced by the pressure changes incident to respiratory movements. Infection in the right lower quadrant spreads upwards and travels in a direction lateral to the cecum and ascending colon. An infection originating in the pelvis usually follows the same course but may ascend up to the left gutter. When the infection reaches the posterior inferior aspect of the liver, it then forms a subhepatic collection or, as more commonly happens, spreads upwards over the superior surface of the liver to form a subphrenic abscess. An infection originating in the gall bladder, pylorus or duodenum spreads as a rule to the right subhepatic area, then may pass either over or under the liver to form a collection in the posterior or anterior superior space. Infections originating in the perinephric area spread by direct extension to the corresponding posterior superior space. Lesions of the stomach may give rise to an infection which spreads to the left, either posteriorly or anteriorly depending upon its relation to the gastrohepatic omentum. In two of our cases, an involvement of the left inferior anterior subphrenic space took place after gastrectomy. The source of infection in our cases is indicated in table I. Since most intraäbdominal infections originate in the appendix, in the pelvic organs, gall bladder or in the upper intestinal tract, the frequency of right-sided subdiaphragmatic collections is far greater (92 per cent in our series) than left-sided ones. Ochsner and Graves[7] graphically represented the frequency of involvement of the various subphrenic spaces in their own and in a large series of collected cases. We have added the Lahey Clinic cases to their chart and have reproduced it in figure 1.

The pathways of spread of an infection to a subphrenic area were illustrated well many

*From the Surgical Department, Lahey Clinic, Boston, Mass.

†Overholt, Richard H.—Surgeon, Lahey Clinic, Boston, and in charge of Department of Thoracic Surgery. Donchess, Joseph C.—Fellow in Surgery, Lahey Clinic. For records and addresses of authors see "This Week's Issue," page 332.

TABLE 1

Case Number	Sex	Age	Source of Infection	Onset of Complicating Signs After Op.	Interval Between Appearance of Complicating Signs and Drainage of Subphrenic Abscess	X-ray Evidence of SUBPHRENIC ABSCESS: Elevated and Fixed Diaphragm +	Obscured Costo-Phrenic Angle +	Density in Lung Field Increased +	Gas Bubble Below Diaphragm +	Displacement of Heart +	Pus Obtained by Aspiration +	Fluid in Pleural Cavity Shown by X-ray at Op. +	Operation Site	Number of Stages	Result	Duration Period of Hospitalization After Drainage of Subphrenic Abscess	Complication or Cause of Death
1	M	48	Infected Hemorrhoid	3 mos. No.Op.							+		R.P.	2	Died		? Septicemia
2	F	30	Append. Abscess	2 mos.	4 mos.	+	-	-			+	-	R.P.	2	Died	1 month	Pyelophlebitis; septic thrombosis, portal vein (PM)
3	F	50	Acute C.B.	No Op.	10 days	+	+	+	+		+	-	R.P.	2	Recov.	1 month	
4	M	33	Bullet Wound	No Op.							+		R.P.	2	Recov.		
5	M	52	? Liver Abscess	2 wks. No Op.	10 days	+	-	+		+	+	-	R.P.	2	Recov.	24 days	
6	F	40	Empyema Gall-Bladder	4 days	10 days	+	-	-			±	+	R.P.	2	Recov.	1 month	Pneumonia
7	M	38	Gastrectomy Ulcer		13 days P. O.	+	-	+			+	+	L.A. thru wound	1	Died	1 day	Slough, trans. colon (PM)
8	M	25	Perforated Appendix Pelvic Abscess	4 days	13 days	+	+	+			+	+	R.P.	2	Recov.	1 month	
9	M	63	Cholecystectomy	10 days	7 days	+	-	+			+	+	R.P.	2	Recov.	11 weeks	Empyema
10	F	40	Gangrenous Appendix	7 days	8 days	±					±	-	R.P.	2	Recov.	3 months	
11	F	40	Acute C. B.		14 da. P.O.	+	+	+			+	-	R.P.	1	Recov.	1 month	
12	M	55	Choledochostomy Tumor, Pancreas	7 days	15 days	+	-	+			+	+	R.P.	1	Died	1 month	Benign Tumor of Pancreas; Biliary Obstruction (PM)
13	M	22	Gall-Bladder Op.		4 mos.	-	-	+					R.A. thru wound	1	Recov.	3 weeks	
14	M	30	Empyema	3½ mos.	? days		-	+			-	-	R. A.	1 RUQ	Recov.	3 weeks	
15	M	48	Perforated Duod. Ulcer	4 days No Op.	4 days	+	+	+			-	-	R. A.	1 RUQ	Died		Bronchial Fistula. Died 1 yr. later of Bronchopneumonia
16	F	76	Perf. Appendix	4 days	7 days		-	+					R.P.	1	Recov.	3 weeks	
17	M	35	Trauma Pick Axe	11 days No Op.	9 days						+	-	R.P.	2	Recov.	6 weeks	
18	F	23	Acute C.B.	14 days	4 days	+					-	-	R.A. thru wound	1	Recov.	21 days	
19	F	69	Gangrenous Gall-Bladder	4 days	Aspir. 14 days	+	+	+			+	+ R.P.	-	-	Died	4 days	Bronchopneumonia; Empyema; Lung Abscess; Moribund on admission (PM)
20	F	27	Cholecystectomy	11 days	15 days	+	+	+		+	-	+	R.P.	1	Recov.	3 months	Bronchopneumonia
21	M	44	? Liver Abscess	4 mos. No.Op.	?	±					-	-	R.P.	1	Recov.	17 days	Draining sinus 9 weeks
22	M	59	Appendix Abscess	10 days	3 days	+	+	+			-	+	R.P.	2	Recov.	8 weeks	
23	F	35	Complete Gastr.	4 days	14 days P.O.	+	-	+			-	+	L.A. thru wound	1 LUQ	Died	13 days	Necrosis spleen and liver; Abscess rt. lung (PM)
24	F	36	Perf. Appendix	14 days	4 weeks	+					-	+	R.P.	2	Recov.	21 da.PO	
25	M	54	Choledocho jejunostomy		13 days P. O.	+	-	+	+	+		+	R.A. thru wound	1 RUQ	Died	14 days	Obstructive Jaundice (PM)

TOTALS	SUMMARY												
Males 14	Present	+19	+ 7	+16	+ 2	+ 3	+14	+10	RP 18		Died 8		
Females 11	Absent	- 1	-10	- 2	20	19	- 7	- 8	RA 5		Recov.17		
									LA 2				

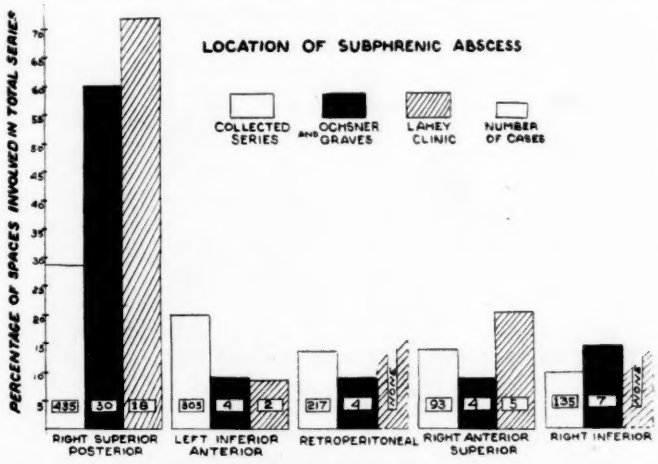

FIG. 1. Chart showing frequency of involvement of the various subphrenic spaces as found in collected cases and in the Lahey Clinic cases. Note that in our series an overwhelming majority of the collections were found in the right superior posterior space.

years ago by Barnard[3]. Drawings which are close reproductions of Barnard's diagrams are shown in figures 2, 3 and 4. In figure 2, the various sources of intraperitoneal infection are given and the direction of the spread which the infection takes to reach the space beneath the diaphragm are shown. Figure 3 represents a sagittal view of the right abdomen showing the path of travel up the right gutter (lateral to the cecum and ascending colon) to both the posterior and to the anterior space. This drawing also illustrates the close proximity of the perirenal tissue to the posterior space. By direct extension, the infection has only to break through the parietal peritoneum at one point to involve the space beneath the diaphragm. The reflections of the peritoneum between the liver and diaphragm are shown in figure 4. This illustration represents a view of the superior surface of the liver. The diaphragm has been removed. The shaded portion of the superior surface of the liver indicates the area of attachment of the triangular ligaments on each side and the falciform ligament anteriorly. The peritoneal reflections divide, therefore, the free spaces beneath the diaphragm into four compartments. It can readily be seen that the largest free portion of subphrenic space is over the right anterior and lateral aspects of the liver. The attachment of the right triangular ligament is broad, and extends posteriorly a considerable distance. The division of the two spaces on the right side has little practical significance because most collections are not limited strictly to either space but spread laterally over the free liver surface. All such collections are usually drained through a lateral incision either transpleurally or subpleurally.

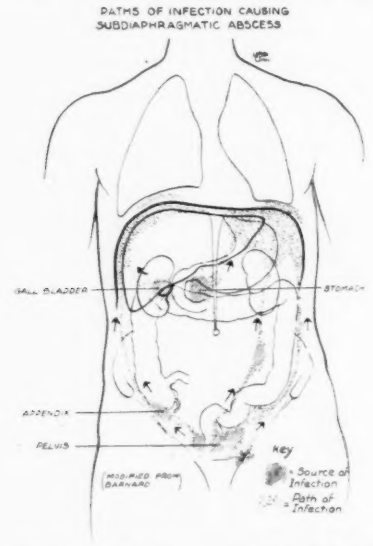

FIG. 2. Diagram (after Barnard) which illustrates site of origin of intraäbdominal infection and the pathways of spread. These points of origin are in the gall bladder, in the duodenum, in the pylorus, in the appendiceal region and at times spread toward the right from the pelvic area. Note that the upward pathway on the right is shorter and more direct than on the left.

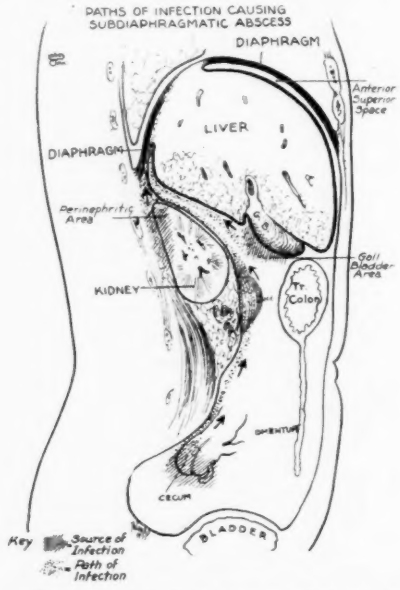

FIG. 3. Diagram of sagittal view of right abdomen (just lateral to ascending colon) showing pathway of spread up the right gutter. Note close proximity of the perinephritic area to the posterior subdiaphragmatic space.

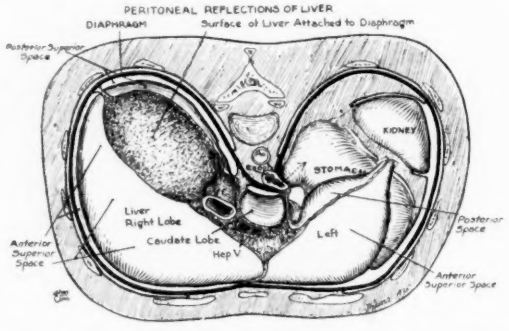

FIG. 4. Diagram of superior surface of the liver showing line of reflection of peritoneum to form the diaphragmatic attachments of the liver. Note that this surface of the liver is divided into four spaces.

That infection gains entrance to the spaces beneath the diaphragm most often by direct extension along the pathways mentioned cannot be questioned. It is maintained by some, however, that an infection of these spaces may be blood borne or result from a lymphatic spread. Such a method of travel is probably rare. Direct extension downwards from a pleural empyema may occur but even this is unusual. There was one such case in our series. The reverse is a much more common occurrence. A continuation of a subphrenic abscess into the chest was found in two of our cases. From a practical point of view, it can be concluded that ninety per cent of all subdiaphragmatic collections involve the right subphrenic space and result from a direct spread of infectious material from some other region in the peritoneal cavity. Factors, other than the peritoneal reflections, also

influence the spread of intraperitoneal infections.

INFLUENCE OF RIBS AND DIAPHRAGM

The part that the pressure changes in the upper abdomen play has not been emphasized in proportion to their importance from an etiological standpoint. The thoracic cage covers the upper third of the abdominal cavity and together with the diaphragm fairly well surrounds the space we are discussing. The constant motion of the boundaries of this space incident to the act of breathing obviously creates variations in the intraperitoneal pressure of this portion of the abdomen. It is the general belief that the pressure in the peritoneal cavity is positive. It has been conclusively shown by one of us, Overholt[11], and by others[12] that the intraperitoneal pressure in the upper abdomen is less than atmospheric pressure during quiet respiration. Overholt demonstrated in animals that the pressure in the upper abdomen oscillates in the negative phase corresponding to the changes in intrapleural pressure. In other words, it was shown, that during inspiration the pressure beneath the diaphragm was less (a greater negative pressure) than during expiration. This fact was explained on the following basis: During inspiration the outward movement of the ribs enlarges the space in the upper abdomen more than it is decreased by the descent of the diaphragm. The alterations that take place in the intrapleural and in the intraperitoneal pressure during the two phases of respiration are diagrammatically represented in figure 5. With respiration the outward movement of the thoracic cage, which extends over the upper abdomen, increases the negative pressure during inspiration. Should a tube be inserted into the subdiaphragmatic space, as is shown in this figure, and its distal end placed under water, a negative pressure during quiet breathing can be demonstrated. Water will rise in the tube to the highest level during inspiration. In two patients convalescing from a subphrenic abscess the drainage tube (with the wound itself packed with gauze) was placed under water as shown in figure 5. During inspiration, fluid was sucked up in the tube and during expiration the water in the tube dropped. This observation demonstrates what may happen to free pus in the peritoneal cavity once it reaches the upper abdomen. The infectious material is actually sucked up to that part of the peritoneal cavity where the negative pressure is the greatest. The constant sucking effect of rib movements and diaphragmatic action is undoubtedly an important etiological factor in the formation of subphrenic abscess.

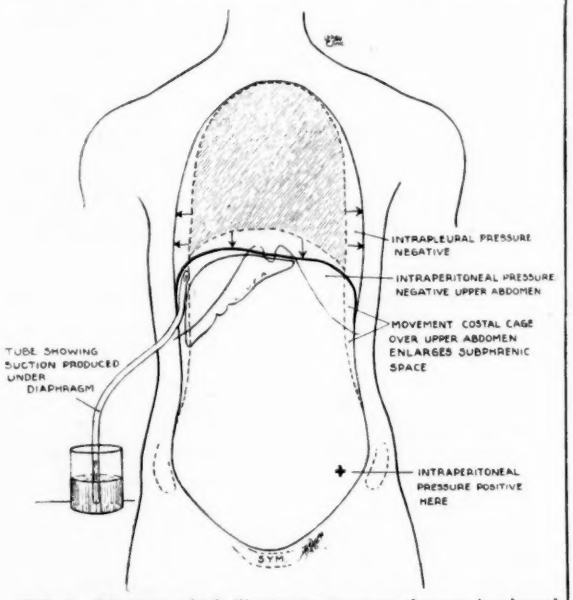
INTRAPLEURAL PRESSURE NEGATIVE
INTRAPERITONEAL PRESSURE NEGATIVE UPPER ABDOMEN
MOVEMENT COSTAL CAGE OVER UPPER ABDOMEN ENLARGES SUBPHRENIC SPACE
TUBE SHOWING SUCTION PRODUCED UNDER DIAPHRAGM
INTRAPERITONEAL PRESSURE POSITIVE HERE
SYM.

FIG. 5. Diagram which illustrates pressure changes in pleural and in upper abdominal cavities as a result of respiratory movements. The costal cage extends well down over the upper abdomen and therefore at the time of the outward excursion a suction is created in the subphrenic space. To illustrate this, a tube is shown draining the subphrenic area. Its distal end has been placed under water. During inspiration water is sucked up in the tube.

Fortunately, there are forces acting to prevent the upward spread of infectious material in the peritoneal cavity, namely, walling off of the process with granulation tissue, and the effect of gravity. The half-sitting position of the patient so often employed postoperatively, is a valuable prophylactic measure. It is desirable that respiratory movements be kept as quiet as possible. Jerky or deep thoracic movements undoubtedly tend to increase the spread of an intraperitoneal infection.

DIAGNOSIS

The possibility of a subphrenic abscess confronts us whenever the general evidences of sepsis disturb the postoperative course of an abdominal case. After ruling out the common complications such as wound infection, pulmonary difficulties, pyelitis, or peritonitis, an abscess under the diaphragm must be considered. In figure 6 are shown representative temperature charts of patients who were proved to have subphrenic abscesses. All are suggestive of the accumulation of purulent material somewhere. Symptoms which may suggest such a location for an abscess are as follows:

1. Upper abdominal discomfort, with or without pain.
2. Difficulty in breathing.
3. Referred pain to the chest, shoulder, or neck.
4. Hiccough.

Local signs which may or may not be present:

1. Limitation of respiratory movements.
2. Edema of the skin overlying the region involved.
3. Tenderness and painful fist percussion.
4. Downward displacement of the liver.

5. Palpable mass below the costal arch if the collection is large.
6. Chest findings:
   a. Elevated and limited motion of the diaphragm.
   b. Decreased or absent breath sounds in the lower chest.
   c. Physical signs of fluid in the chest above the diaphragm.

phrenic lesion. The diaphragm may be high, the lung clouded and a fluid level present. Upon exploration of the subphrenic area a generalized involvement is found. The clinical course and abdominal signs should differentiate a local and a general infection within the peritoneal cavity. 2. Liver abscess. Single or multiple abscesses within the liver may be confusing.

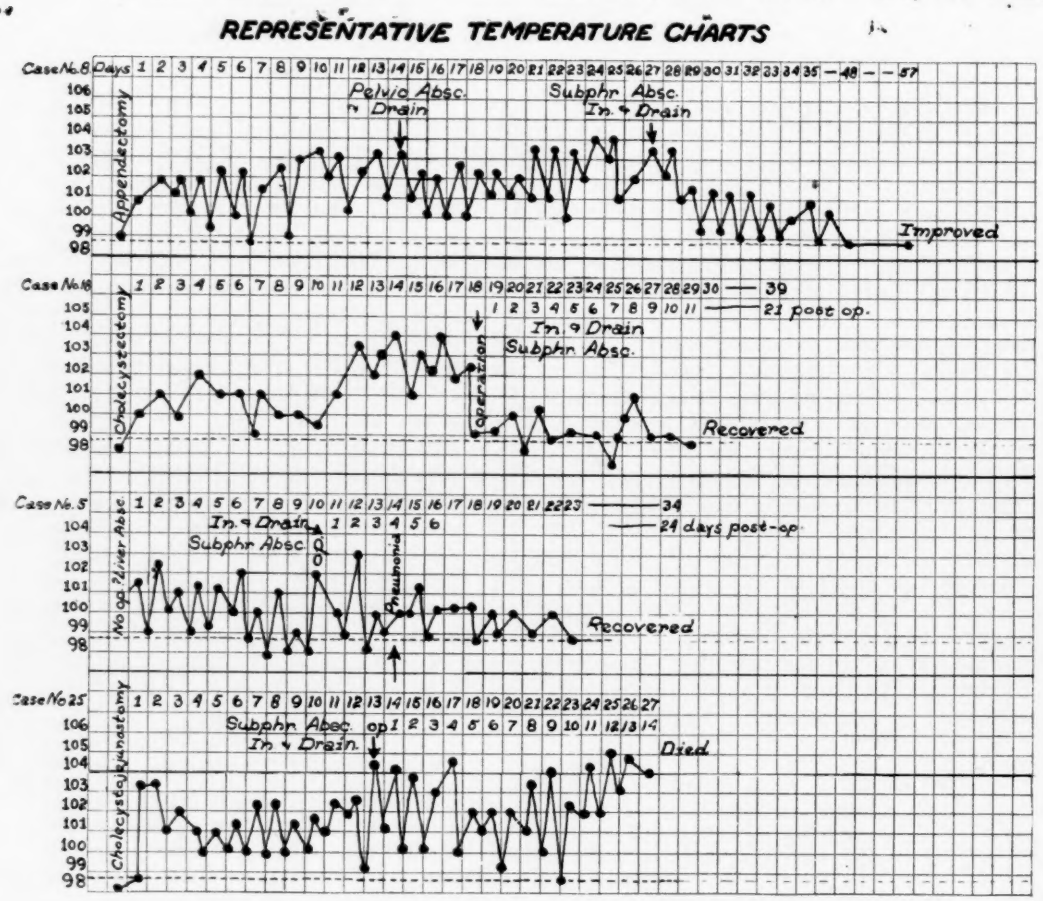

FIG. 6. Reproductions of typical temperature charts in subphrenic abscess. Note that in some cases, the temperature is sustained after the original operation. In others the curve has returned to normal, then a recurrence of the elevated temperature occurred and was maintained until the subphrenic collection was drained.

7. X-ray findings:
   a. Elevated and fixed diaphragm.
   b. Varying degrees of haziness of diaphragmatic shadow.
   c. Costophrenic angle obscured.
   d. Haziness of the lung field.
   e. Displacement of the heart away from the involved side.
   f. Gas bubble with fluid level under the diaphragm.
8. Diagnostic needle aspiration.

DIFFERENTIAL DIAGNOSIS

Other conditions leading to an erroneous diagnosis of subdiaphragmatic abscess may be listed as follows: 1. The presence of a generalized peritonitis with apparent localizing signs has been, in our experience, one of the most difficult situations to separate from a true sub-

The clinical course is severe. Jaundice may be present and a more definitely palpable liver edge would be expected. The diaphragm is not so markedly elevated and the lung reaction is less pronounced. X-rays fail to show a gas bubble between the liver and the diaphragm. 3. Perinephritic abscess. Edema and tenderness in the costovertebral angle are similar in the two conditions, but there is less change in the position of the diaphragm and less pleural reaction. 4. Thoracic empyema, especially the encysted diaphragmatic type, may be confusing. The lung base and diaphragm are obscured in the x-ray picture. The history and clinical course are dissimilar. An absolute differentiation can be made by needle aspiration, air injection, and x-ray reëxamination. 5. Postoperative uni-

lateral lower lobe or massive collapse. The diaphragmatic shadow in the x-ray is elevated in both conditions and the lung base obscured. In lower lobe collapse, the heart is drawn toward the affected side while with a subphrenic collection it is displaced away from the side of the lesion. A fluid level below the diaphragm may outline the diaphragm and establish the diagnosis. Muller, Overholt, and Pendergrass[13] found a high diaphragm with some cloudiness of the lung base in the majority of patients after abdominal operations. Normally all postoperative patients who have had the abdomen opened within ten days show: 1. Elevation of the diaphragm, 2. Fixation of diaphragm, 3. Varying degrees of atelectasis of the lower lobes, 4. Air accumulations beneath the diaphragm. Since these x-ray appearances are the usual and normal postoperative findings in all cases which have had a laparotomy, the problem of the differential diagnosis of subdiaphragmatic collections becomes more complicated. In figure 7 is

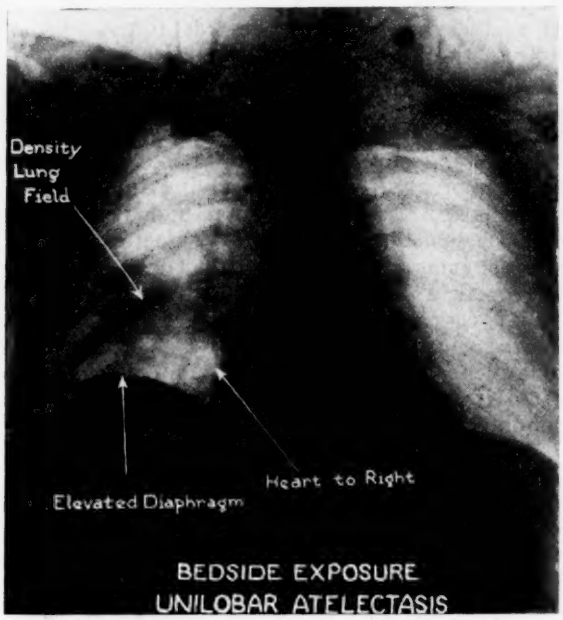

FIG. 7. Bedside roentgenograms of the chest of a patient who had a unilobar atelectasis on the right side which was proved two days later by autopsy. Note similarity of the appearance in this film and of that seen in the subphrenic patient. (Figure 8.) There is an elevated diaphragm, density of the lung fields, but the heart is displaced slightly to the affected side.

shown a postoperative bedside roentgenogram of a patient who had had a massive unilobar atelectasis proved at autopsy. The appearance is not unlike that seen in figure 8 which is shown to illustrate the so-called typical x-ray features of subdiaphragmatic abscess.

TREATMENT

The basis of the treatment of subphrenic abscess is incision and drainage. Obviously, this should be provided as soon as possible after the diagnosis has been established. Because of the location of the abscess, the dangers of delay are great. In addition to the effects of prolonged sepsis an extension in any direction may contribute to a fatal outcome. The two-stage transpleural operation has been the one most universally employed. The first stage consists in the resection of segments of one or two ribs (8th or 9th) in the midaxillary line, under local anesthesia. The corresponding intercostal vessels, nerves, and muscle bundles are removed. This is an important step in the technique of the first operation. A removal of a segment of the intercostal vessels prevents hemorrhage at the time of the cauterization later. The removal of the intercostal nerve in the drainage area elim-

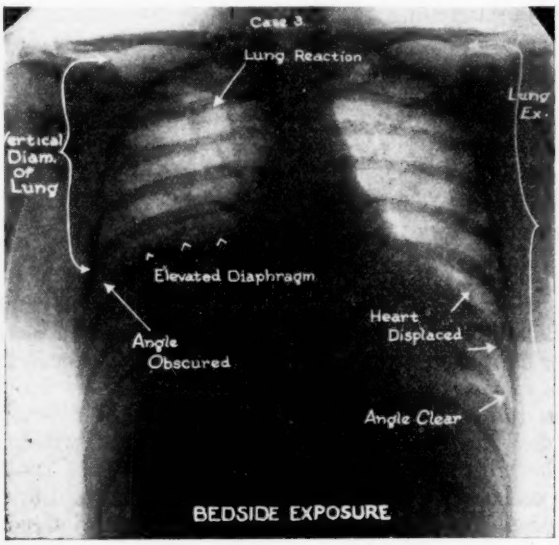

FIG. 8. Bedside roentgenogram of the chest of a patient who had a subphrenic abscess. Note the elevated diaphragm, the obscured costophrenic angle, the haziness of the overlying lung and the displacement of the heart away from the side of the involvement. Note also that the fluid level below the diaphragm is not apparent.

inates much of the pain. The parietal pleura is then anchored to the diaphragm with interrupted sutures around the circumference of the base of the wound. Gauze packing is then inserted and the wound is loosely closed over the gauze. The second stage is carried out twenty-four to forty-eight hours later, which gives sufficient time for the drainage tract to be sealed. The wound is then re-opened, the gauze pack removed and the adherent pleura and diaphragm opened with the cautery. An incision sufficiently large to admit the examining finger is made. The ramifications of the abscess cavity are explored and its trabeculations are broken down. Wide drainage is established and maintained by the use of cigarette drains and a tube for irrigation purposes.

The subphrenic space can in some cases be approached safely by an incision below the line of the pleural reflection (i.e., the costophrenic sinus) and the abscess cavity entered immedi-

ately without the necessity of a division of the operation into stages. This route of drainage can be established by placing the incision below the costal border and carefully sliding the exploring finger upwards under the ribs, extraperitoneally, to the abscess cavity. Ochsner favors an excision of a portion of the twelfth rib and thereby approaches the abscess retroperitoneally. He was able to show a lower mortality by this method than by any other. The operation advocated by Ochsner has two distinct advantages. The operation is a one-stage procedure and the dangers of a contamination of the pleural or peritoneal cavities during the process of establishing the drainage tract are lessened.

In managing the care of these patients after operation, it has been our practice not to disturb the original pack for four or five days. When the cigarette drains are removed, a continuous drip of half strength Dakin's solution is introduced and constant gentle suction applied to the outlet tube. The obliteration of the cavity is often prolonged if such suction is not employed.

SUMMARY OF CASES

In the past fourteen years there are in the Lahey Clinic records of twenty-five proved cases of subphrenic abscess. A summary of these cases is shown in table I. It is interesting to note that in the postoperative group the signs of a complicating peritoneal infection appeared within the first four to eleven days. The fact that localization with signs sufficient to make a diagnosis of a subphrenic abscess is often prolonged even after the appearance of the first complicating signs is borne out by study of the average length of time required to establish the diagnosis. Undoubtedly the presence of associated disease, such as general peritonitis, pneumonia, and lung abscess, as occurred in this series of cases, was responsible for the long interval between the first complicating signs and institution of drainage of the subphrenic abscess. This interval averaged between seven and fourteen days.

The summary clearly demonstrates the value of the x-ray in the diagnosis of this condition. The various signs looked for in the x-ray film are grouped together in the chart. The diaphragm was found to be elevated in every instance excepting two when such an examination had been made. Haziness of the lung field was second in frequency and was present in sixteen cases. We were surprised to find the shadow of a gas bubble below the diaphragm in only two of the cases in the entire series. There was cardiac displacement in three of the cases. This finding is dependent, of course, upon the extent of the rise of the diaphragm and of the associated pleural effusion. It becomes evident from a review of the x-ray appearances in these cases that a gas bubble with a fluid level should not be considered one of the cardinal signs of subphrenic abscess.

In the majority of our cases, a diagnostic tap was done. Pus was obtained in fourteen out of twenty-one aspirations. There were seven cases, or one-third of the total with proved subphrenic collections, which gave a negative tap. It is our feeling, therefore, that this procedure is of doubtful value. Obviously, if pus is found, the area must be drained. Also, if pus is not found, it does not prove its absence and in the presence of a clinical and x-ray diagnosis of a subphrenic abscess, operation is justified regardless of the tap. We may rightfully ask then what may be accomplished by such a procedure? This procedure is not without danger, as the pleura may be traversed by a contaminated needle. In one case in our series empyema complicated the treatment, due either to the tap or to the transpleural drainage. Fortunately this case survived. Fluid was demonstrated in the pleural cavity by x-ray or was found at the time of the first-stage transpleural operation in ten of our cases. The presence of fluid in the chest probably explains the frequency in the x-ray of haze or of an increased density of the lung field. In fact, it is quite likely that the x-ray appearance of the overlying lung is due to pleural fluid accumulation and not to an actual edema or inflammatory reaction in the parenchyma of the lung itself. Our experience in regard to the presence of pleural fluid, therefore, is contrary to that of Ochsner and Graves[7]. We agree with Clute[14] and Beye[6] who found that pleural effusion is one of the frequent and often is an early sign of the development of a subphrenic abscess.

RESULTS

Every patient who had a diagnosis of subphrenic abscess, no matter what other condition was present, has been included in this report. In reviewing the cases, it was found that eight deaths occurred. From an analysis of these cases, it was found that none died primarily of the subphrenic condition per se. One patient entered in a moribund condition and was not operated. Of the seven others all died of the primary condition which originally gave them their subphrenic abscess. In six of the seven cases, autopsy established this fact. For instance, in case twenty-three, a complete gastrectomy was done and a leak of the gastro-esophageal suture line occurred. The patient developed a left-sided subphrenic abscess, as well as a mediastinal infection and died of generalized sepsis. It is, therefore, difficult to appraise such a series of cases and determine to what extent the development of the subphrenic abscesses had to do with the deaths.

There can be little doubt, however, that the

presence of a collection of pus in such a location contributed to the high mortality in this group. If we are to be self-critical in regard to the management of these patients, it might be said that the period of time between the onset of complicating signs and the institution of drainage was too long. All of the so-called cardinal signs of such a collection need not be present to warrant exploration of this space. Evidence of sepsis following an abdominal operation without discovery of a cause elsewhere together with a unilateral elevation of the diaphragm with varying degrees of haziness of the lung field above should be enough. Exploration subpleurally or transpleurally can be done under local anesthesia with slight risk. The early and adequate drainage of a subphrenic abscess will be an important contributing factor in securing a lower mortality rate in patients with subphrenic infections.

SUMMARY

1. Subphrenic abscess as a complication of abdominal disease has been discussed.
2. Etiological factors and pathways of spread have been considered.
3. Diagnostic procedures have been commented on.
4. The influence of a negative pressure in the upper abdomen and of the sucking action of costal and diaphragmatic action upon the formation of collections in this area has been pointed out.
5. A brief report of experiences with twenty-five proved cases has been given.

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THE USE OF SODIUM EVIPAL AS AN ANESTHETIC FOR SHORT SURGICAL PROCEDURES*

BY WALTER E. GARREY, M.D., † AND ROY B. COHN, M.D.†

THE need for a readily available and less cumbersome anesthetic for short surgical procedures impelled us to try anesthesia with sodium evipal. It is a barbituric acid compound which has now been in use nearly three years as an intravenous anesthetic. It has seemed particularly adaptable to work in the out-patient dispensary and emergency room where it chiefly displaces gas-oxygen anesthesia.

EXPERIENCE ELSEWHERE

The reported clinical experience with this drug is large. There are an extensive number of case reports in the German literature which have been comprehensively summarized in English by Killian[1] of Freiburg. These total 15,000 cases with one death in a woman very ill with puerperal sepsis. Sebening[2] of Frankfort has reported in English his experience with 200 short surgical anesthesias with sodium evipal. Jarman and Abel have published three articles covering respectively their first hundred, first thousand[3], and first two thousand[4] cases and the reader is referred to their articles for a scholarly and comprehensive presentation of the subject. They have extended its use in combination with other drugs to longer anesthesia.

DOSAGE AND ADMINISTRATION

The drug is dispensed in sterile glass ampoules containing one gram of the powder. For administration this is dissolved in ten cc. of sterile distilled water.

A safe maximum dose may be calculated on weight basis by multiplying the patient's weight in pounds by 0.06 to obtain a safe maximum number of cubic centimeters of solution to inject. Thus an adult weighing one hundred and fifty pounds could safely receive a total of nine cc. of solution containing .9 Gm. of the drug.

We have preferred to use a fractional method of administration injecting three to four cc. into the vein at the rate of one cc. each fifteen seconds and stopping the administration there when the patient was asleep. We have then left the needle in the vein so that more might be injected if the patient showed any evidence of recovering before the operation was through. It is surprising how often the smaller doses of .2 to .4 Gm. of the drug will induce loss of con-

*From the Surgical Services of the Massachusetts General Hospital.

†Garrey, Walter E.—Resident, East Surgical Service Section, Massachusetts General Hospital. Cohn, Roy B.—House Officer, East Surgical Service, Massachusetts General Hospital. For records and addresses of authors see "This Week's Issue," page 332.

sciousness for long enough to do the required manipulation and the recovery period is thus shortened to a few moments. This method provides the maximum safety factor in allowing for individual susceptibility and for the fact that the effective dose is not the same for different individuals of the same weight.

The drug is a respiratory depressant. For this reason we have had available at all administrations a tank of oxygen with five per cent carbon dioxide. We have also had on the anesthesia tray coramine (5 cc.) for intravenous use and an ampoule of adrenalin. We have not had any occasion to use these. In other clinics temporary but disturbing cessation of respiration has been noted in cases where a preoperative opiate has been given. Although opiates or scopolamine will lengthen the effect of the drug they are not necessary in the type of case most suited to evipal anesthesia. It has seemed to us dangerous to pyramid two known respiratory depressants.

PERSONAL EXPERIENCE

One or the other of us has personally administered the anesthesia in 120 cases and observed all the inductions, the maintenance and the majority of recoveries. The following types of cases presented themselves:

1. Out-Patient and Emergency Room Cases

Incision and drainage of abscesses and carbuncles.
Incision and drainage of felons, paronychias, septic fingers.
Extraction of multiple and abscessed teeth.
Suture of lacerations (children and about face).
Reduction of Colles', Potts', nasal and greenstick fractures.
Forearm fractures, dislocated shoulder and thumb.

2. In-Patient Cases

Drainage of sepsis:
Peripheral and intraäbdominal abscesses. Tenosynovitis, etc.
Neurosurgical:
Alcohol injection, chiefly of Gasserian ganglion.
Minor gynecological:
Cauterization of cervix, dilatation and curettage.
Uterosalpingograms. Drainage of Bartholin's abscess, etc.
Minor rectal:
Drainage of perirectal abscesses. Excision of strangulated hemorrhoids. Excision of anal fistula. Painful proctoscopy.

Some of the fractures and rectal cases could well have been done with local anesthesia, but it led to the patients greater physical and mental comfort to be asleep. Sodium evipal anesthesia is not adapted to rectal cases requiring dilatation of the sphincter. It is adequate, however, for removal of external hemorrhoids or simple fistula. In pelvic cases the abdominal muscles may be unrelaxed and a good bimanual examination difficult. Many of the emergency room cases were children and the use of evipal was a very real comfort. The anesthesia was found ideal for the eighteen neurosurgical cases and the ten dental cases. All the patients have liked the anesthesia and many have been very enthusiastic about it, in comparison with previous experience with other anesthetic agents. Our youngest patient was an eight months infant weighing eighteen pounds, given sodium evipal for drainage of a septic tendon sheath of the finger. He had recently recovered from pneumonia and had not taken avertin well on a previous occasion. One tenth of a gram was injected into the external jugular vein for induction and with a total of 0.14 Gm. the infant slept soundly for ten minutes of the operation. Our oldest patient was eighty years, and the eight patients of age sixty years or above did well.

(a.) Induction and Maintenance: We have noted nothing at variance with other observers. Induction has been dramatically quiet. Between thirty seconds and two minutes after commencing injection the patient, often preceded only by a single yawn, will be in a deep sleep. The pulse remains the same, the blood pressure drops from ten to thirty millimeters systolic. The respirations have always been regular.

We have used minimal doses. The outpatient cases (adult) have received from .2 Gm. upwards and have slept from four to ten minutes on these smaller doses. The length of sleep has not been constant but has been not less than eight and usually fifteen minutes for the maximum dose of about one gram.

We have observed the common slight muscular twitching in about one-third of the cases. About one-fifth of the patients have remained somewhat rigid and two very husky foreign men have had no muscular relaxation even with the larger dose.

(b.) Recovery: This has been rapid in the minimal dose cases (.3-.4 Gm.) which are often widely awake in from five to ten minutes. Those having larger amounts (.8 to 1.0 Gm.) may remain drowsy or mentally foggy for thirty to ninety minutes. If allowed up too soon they complain of vertigo and behave like intoxicated persons. No case has vomited. Several have mentioned nausea, but this has not been common or unpleasant. Two patients, both husky men, were obstreperous during recovery, one for five minutes and another for twenty minutes. None of the others were even unusually restless. The anesthesia was repeated on one of these and he reduplicated his previous obstreperous performance.

The out-patient cases have been kept for recovery one or two hours and the rare doubtful case sent home in company with a competent friend or relative.

(c.) Untoward Reactions: In two cases we observed cyanosis if the jaw was not held forward and tongue prevented from sagging back. This is most important and, as advocated by Jarman and Abel, a person other than the administrator should be at the head of the table to insure a clear airway. There were no other observed circulatory, respiratory, or other complications.

The blood pressure was accurately followed on fifteen patients and consistently fell from twenty to thirty per cent below preoperative level. In the remainder of cases the administrator kept his finger on the radial pulse which did not change perceptibly in quality or rate.

CONTRAINDICATIONS

In general we have felt that any anesthetic agent on trial should be used for good risk patients, so sodium evipal has not been used in the case of any very ill or debilitated patient. Because its chief potential danger is that of a respiratory depressant, we should hesitate to use it in anyone already cyanotic or in an asthmatic or decompensated cardiac patient. We have followed the conservative course in avoiding its use in patients with hypertension or severe liver or renal disease. Allergic reaction is possible and we have seen urticaria and angioneurotic edema after ingestion of evipal by mouth.

CONCLUSION

1. Sodium evipal anesthesia seems especially adaptable to brief manipulations that would otherwise require a general anesthetic.

2. The chief advantages are the ease of administration, the rapidity of induction and recovery, the freedom from psychic trauma or unpleasant after-effects.

3. There is considerable variation in individual susceptibility to the drug. For this reason the fractional method of administration is the safest and most satisfactory.

4. Observations in 120 cases are briefly recorded.

5. Until more extended experience with the drug has been obtained its use should be confined to the "good risk" patient.

We are indebted to Dr. H. H. Bradshaw, chief of the anesthesia service of the Massachusetts General Hospital, for guidance and advice.

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CYCLOPROPANE: A NEW AND VALUABLE GAS ANESTHETIC*

BY L. F. SISE, M.D.,† P. D. WOODBRIDGE, M.D.,† AND U. H. EVERSOLE, M.D.†

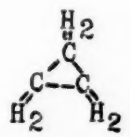
THE recent introduction of cyclopropane to clinical use by Waters of the University of Wisconsin has given us a very valuable new anesthetic agent of most interesting properties.

HISTORY

It had been found that laboratory samples of propylene (C_3H_6) possessed excellent anesthetic properties without appreciable toxic action, but when larger quantities were manufactured these were found to have a toxic action on the heart. Henderson and Lucas in hunting for the source of this toxic action investigated cyclopropane, an isomer of propylene which frequently appears in its preparation. To their surprise they found that cyclopropane was an excellent and very powerful anesthetic with low toxic action[2, 3]. Following this report Waters, after some further laboratory investigation, started its clinical use on human beings. The gas has been studied from different angles by various groups of investigators at the University of Wisconsin, and Montreal.

PHYSICAL PROPERTIES

Cyclopropane is a hydrocarbon gas with the empirical formula C_3H_6 and is therefore isomeric with propylene. Structurally it is a ring compound.



Its molecular weight is 42.05, and its density as compared with air is 1.46. Thus the undiluted gas tends to drop to the floor somewhat as does ether vapor, the density of which is 2.6, and does not float or so readily diffuse as does ethylene, the density of which is 0.975.

Its fat to water solubility is very high, the ratio being given by Henderson and Lucas as 64.4 to 1 as compared with 13.2 to 1 for ethylene and 2.5 to 1 for ether. This characteristic ex-

*The Lahey Clinic, Boston, Massachusetts.

†Sise, L. F.—Anesthetist, Lahey Clinic, and New England Baptist Hospital, Boston. Woodbridge, P. D.—Anesthetist, Lahey Clinic, New England Deaconess Hospital and New England Baptist Hospital. Eversole, U. H.—Anesthetist, Lahey Clinic, New England Deaconess Hospital and New England Baptist Hospital. For records and addresses of authors see "This Week's Issue," page 332.

plains the slowness with which complete saturation and stabilization is obtained.

It is an inflammable gas, and is explosive when mixed with certain proportions of air or oxygen. As with other gases the exact limits of explosibility vary widely under different conditions. Thus in breathing bags containing a spark plug it could not be exploded in mixtures below 19 per cent[7], but in a Hempel explosion pipette it could be exploded in mixtures down to 2½ per cent[1]. Buckman and Wardell of the Ohio Chemical Company give the explosion limits of this gas as determined in the Hempel explosion pipette in per cent by volume as follows:[1]

	Lower Limit	Upper Limit
Cyclopropane and air	3.0	8.5
Cyclopropane and oxygen	2.5	50.0

The lower limits are about the same as for ethylene, but the upper limits are considerably less. The important point, however, is that ordinary anesthetic mixtures of cyclopropane (15 per cent) are well within the explosive limits while ordinary anesthetic mixtures of ethylene (80 per cent-85 per cent) are outside its explosive limits.

Care should of course always be exercised when using any inflammable anesthetic agent, but in using cyclopropane, where we know that the anesthetic mixture is not only inflammable but explosive as well, this precaution should be particularly searching and insistent.

The odor is characteristic and not disagreeable. The gas is slightly irritating. This irritation is so slight that in anesthetic dilution it is not noticeable. With the higher concentrations, however, above approximately 50 per cent, laryngospasm may be caused.

The gas liquefies at a lower pressure than does any other of our present anesthetic gases. The tank pressure is about seventy-five pounds as against about 800 pounds for nitrous oxid and 1,250 pounds for ethylene. Present product is said to be about 99½ per cent pure.

PHARMACOLOGY

Absorption of the gas by inhalation is quite rapid but saturation and equilibrium are not established with such rapidity as with nitrous oxid or ethylene. Even when a closed system is used the gas disappears from this system with considerable rapidity so that it is necessary to keep adding gas in order to maintain the same concentration in the system[5]. It seems probable that this disappearance of the gas is due to its absorption by the lipoids of the body, for which it has a high affinity. Waters and Schmidt found the concentration with human beings for third stage or surgical anesthesia to be in the first plane 7.4 per cent (but with very wide variation); in the second plane 13.1 per cent (less variation), and in the third plane 23.3 per cent. In this third plane the extreme variations were slight, being from 21.1 per cent to 27 per cent[8].

Breathing is very quiet, and there is not the initial stage of stimulation seen with nitrous oxid, ethylene or ether. This gives the impression that respiration is depressed, yet there is no decrease in rate or minute volume until beginning intercostal paralysis. All observers agree that breathing ceases well before circulation.

Circulation is well maintained until the beginning of respiratory depression. At this time the blood pressure begins to drop. Cardiac irregularity does not usually appear until respiration is severely affected and about to cease. Seevers and Meek have made a study of this with the electrocardiogram in dogs[5]. They found the average concentration of the gas when irregularities appeared to be almost 50 per cent. They found the early irregularities to be nodal rhythm or ventricular extrasystole although partial or complete auriculoventricular block was not uncommon. Later effects consisted of ventricular tachycardia and auricular and ventricular fibrillation. That high concentrations of this gas may have a decidedly toxic action on the heart is shown by the death from circulatory failure of two dogs in this series in spite of the presence of adequate alveolar oxygen. Inflation with pure oxygen failed to effect recovery. The concentration of the gas was 52 per cent in one case and 71 per cent in the other, far above the range for third stage anesthesia.

The metabolic effects of cyclopropane are strikingly few. There is a slight rise in the blood sugar. The pH and the carbon dioxide combining power are affected but very little[2]. There is no effect on liver function[4].

CLINICAL USE

This gas is very expensive. The first lot which we used cost $1.25 per gallon. The cost has since been gradually reduced to about forty cents per gallon. As ethylene and nitrous oxid cost in the vicinity of two cents per gallon, it can be seen that even this reduced price is still very high, by comparison. If it attains to popular use, however, a further considerable reduction in price will probably occur. This high cost of the gas precludes the employment of any method of use which wastes any of the gas. The carbon dioxide absorption technic described by one of us in this Journal[9] is therefore the only present method adapted to its use. However, the power of the gas is such that it is unnecessary to waste any gas in a washing out process during induction such as is necessary with ethylene or nitrous oxid in order to get the highest possible concentration. These facts make it possible to produce and maintain anesthesia with amazingly small quantities. In the average adult, if the mask is tight fitting and the closed system does not leak, it is usually pos-

sible to produce third stage anesthesia of an hour's duration with approximately a gallon of the gas. In resistant cases two to three gallons may be necessary, and if a leak is present, any amount may be used. In a number of cases less than half a gallon has been sufficient. This brings the expense within reasonable limits and well under the cost of gas anesthesia with the older agents and methods.

In selecting a gas machine it must be remembered that this gas is solvent for rubber and rubber compounds. As the seats of reducing valves are commonly made of a rubber compound, this prevents the use of these valves with cyclopropane until such time as a more resisting compound is used. The pin type of valve is therefore best adapted to the use of this gas. As the tank pressure is so much lower than with other gases, this type of valve is much more satisfactory here than it has been with the other gases.

This solvent action of the gas on rubber is not manifest in concentrations sufficiently low to be within the anesthetic range. Thus the ordinary rubber breathing bag, tubing and flutter valves may be retained in the gas machine without essential damage.

The procedure at induction is quite different from that with other gases, where large quantities and high concentrations are commonly used. When first using cyclopropane those who are accustomed to the other gases are very apt to overdose the patient, sometimes with alarming results. The high power of the gas must be kept constantly in mind as must also the fact that there is a distinct lag in its effect, not noticeably present with the other gases.

Various methods may be used for induction. We have found the following general scheme satisfactory with minor changes to suit the individual case. A rapid flow of oxygen is started. When the amount in the breathing bag becomes enough to accommodate tidal breathing, the mask is placed on the face and the oxygen flow is reduced to the estimated basal requirement, usually 200 to 300 cc. per minute. Cyclopropane is now started at 400-700 cc. per minute. This flow is maintained until, usually in about one to two minutes' time, there is loss of lid reflex. The flow is now either reduced to about a third of this amount for perhaps another minute, or is cut off entirely depending on the depth of anesthesia now desired. Thereafter the oxygen flow is regulated to the basal requirement of the patient, and perhaps small amounts of gas are admitted as indicated.

During maintenance we have had considerable difficulty in correctly estimating the depth of anesthesia. This estimation appears to us more difficult with this gas than with any other inhalation anesthetic with which we are familiar. In general the signs of depth are similar to those with ether anesthesia, and are not difficult to detect with deepening anesthesia provided the deepening is reasonably slow. In the third or surgical stage of anesthesia, activity of the extra-ocular muscles is maintained in the first plane, and ceases as the second plane is approached, while intercostal activity is maintained in the second plane and ceases as the third plane is approached. If the progress of the anesthesia has not been too rapid, the signs up to this point are not difficult to recognize; but when the desired depth of anesthesia has been obtained it is often most difficult to detect the occurrence of a lightening from this depth. Each of us has on more than one occasion had the embarrassing experience of failing, even with most careful scrutiny, to detect any change in breathing, in eye signs or other phenomena to indicate change in depth, till the patient made some obvious sign of lightness like raising the knee!

Experience has of course been a help, for most of these occurrences have been in our early work. Preliminary medication is also quite important as it appears to cloud the signs of anesthesia. These signs are much clearer if little or no premedication has been used.

This undetected lightening of anesthesia may be to some extent guarded against by admitting at not too frequent intervals (five to ten minutes) small amounts (about 100 cc.) of the gas. While this is in one way a very unsatisfactory procedure, inasmuch as it does not clear up the signs of anesthesia, yet it is an entirely logical procedure, since we know that stabilization is very slow and that for a considerable period (over an hour) the gas is being lost from the closed system probably to the lipoids of the body. The above procedure replaces this gas which we know is being lost.

Those who begin the use of cyclopropane should bear constantly in mind its great power and its rapidity of action. The effects of the higher concentrations are simply astounding and are unbelievable to those who think in terms of the weaker gases, nitrous oxid and ethylene. With these gases our chief warning comes from signs of anoxemia. With cyclopropane on the other hand drastic overdosage takes place in the presence of abundant oxygen. This is a most important point to remember. If too high concentrations of the gas are used the patient passes from one stage of anesthesia to another with such rapidity that the successive stages cannot be recognized, and he, therefore, may plunge into extreme overdosage with great rapidity and abruptly cease breathing. Relaxation is such that breathing is easily obstructed. Crowing respiration is here common, and the obstruction may become extreme so rapidly as to constitute an acute emergency. Much preliminary narcotic medication is inadvisable, since cyclopropane lacks stimulating properties to offset the narcotic effect. If much preliminary nar-

cotic has been used, undue depression or abrupt cessation of breathing may result. The medication may be given with a view to preoperative apprehension only, since anesthesia is satisfactory with no premedication whatever. We, therefore, have discontinued the use of a barbiturate and use only morphine sulphate grains 1/8 and scopolamine hydrobromide grains 1/200 to 1/150.

The possibly deleterious action of this gas on the heart muscle should be kept in mind. Note that in the experimental work of Seevers et al. two dogs died of circulatory disturbance in the presence of adequate oxygen and in spite of artificial respiration. Hence the pulse should always be carefully watched, and the advent of any irregularity or any considerable change in rate in either direction should dictate a prompt lightening of the anesthesia.

RECOVERY

Recovery of consciousness is rapid, approximating that from the other gases, but complete desaturation does not take place for several hours. The estimation of postoperative results may be made most accurately from the very careful and painstaking study by Schmidt and Waters[6], with which our clinical impressions are in accord. In this study 2,200 cases under cyclopropane were compared with a like number under ethylene, nitrous oxid or ether. Schmidt and Waters found: 1. There were fewer respiratory complications under cyclopropane. 2. There was more circulatory damage under cyclopropane. This statement they qualified, feeling that further study is needed. 3. Nausea and emesis were less in major surgery but possibly more in very short and minor operations.

USES

The combination of certain properties in cyclopropane make it unique among anesthetic agents. Probably no other agent combines in itself as does cyclopropane speed both in induction and recovery, high oxygen supply during anesthesia, and power to produce a considerable degree of relaxation, together with a minimum of deleterious effects on the various organs and functions of the body. The quiet type of breathing which it produces is also desirable. This combination of properties makes it a very valuable anesthetic agent.

On the other hand its very speed and power make it potent for danger unless these properties are thoroughly appreciated and allowed for; and the cardiac effects in high concentrations should always be borne in mind. The explosibility of anesthetic mixtures of this gas must also be remembered and carefully guarded against. It should, therefore, not be employed where diathermy or x-ray or other high potential electrical equipment is to be used.

Its chief fields of usefulness appear to be as follows:

1. *Chest surgery.* Here the high oxygen supply is a great advantage. These patients almost always have a lowered vital capacity. The position during operation and the release of negative pressure in the chest often put them at a great disadvantage in breathing. The power of the anesthetic is of value in overcoming the marked reflexes which often arise from stimulation of the pleura. The quiet breathing is a help to the surgeon in his work, and rapid recovery of cough reflex is valuable.

2. *Respiratory obstruction.* Here the high oxygen supply is also of value. Where practical we have always used intratracheal anesthesia in these cases. The power to relax the jaw and larynx makes cyclopropane one of the best agents for intubation.

3. *Marked anemias.* The advantage of the high oxygen supply is here obvious.

4. *Cardiac cases.* Here again the high oxygen supply appears advantageous, especially where decompensation is present. Because of its deleterious action on the heart muscle, however, its value here is subject to qualification. This deleterious action, however, has been definitely shown only in comparatively high concentrations. In the weaker anesthetic mixtures it has not been shown and clinically does not appear to be present. If, therefore, the contemplated operation demands considerable depth, cyclopropane might not be so advantageous as some other anesthetic. But in all other cases, where marked depth is not necessary, it is our clinical impression that the high oxygen supply, the quiet breathing, and the comparative lack of stimulation to the pulse and blood pressure more than compensate for the possibility of deleterious action. Further experience and study are necessary, however, before more definite statements can be made.

5. *States of marked debility and shock.* The advantages and qualifications are very similar here to those already discussed for cardiac cases.

6. *Short procedures where a moderate amount of relaxation is desirable.* This would include, for example, pelvic examinations, simple reduction of fractures (but not in x-ray room) and manipulation of joints.

7. *Possibly abdominal operations.* Our own experience in this field is too limited to hazard an opinion. From the experience of some others, however, it would seem probable that those surgeons who have been accustomed to operating under nitrous oxid or ethylene would find the increased relaxation of cyclopropane very gratifying, while those who are used to the relaxation of spinal anesthesia would not be so enthused.

8. *As an adjuvant to other anesthetics.* With patients who are resistant to ethylene the addition of a comparatively small amount of cyclopropane to the mixture will almost always result quickly in the attainment of a satisfactory plane of anesthesia, and at the same time make possible an adequate supply of oxygen. The change wrought in these cases is most gratifying. It should be remembered, however, that if more than a small amount of cyclopropane is added, a considerable amount of oxygen will also have to be added. The proportion which the oxygen will then hold to the two inflammable gases, ethylene and cyclopropane, will probably be such as to place the resulting mixture well within the explosive range, whereas an anesthetic mixture of oxygen and ethylene alone is usually entirely outside the explosive range. But, if the cyclopropane added is only just sufficient to produce the desired effect the oxygen supply may still probably be kept down sufficiently to keep the mixture outside the explosive range.

If, instead of ethylene, nitrous oxid is being used, the addition of more than a very small amount of cyclopropane even without increased oxygen supply will, because of the oxidizing power of nitrous oxid, place the mixture within the explosive limits, just as is the case when ether is added to nitrous oxid mixtures.

Tables 1, 2, and 3 are compiled from a series of our cases taken in succession without selection. It includes cases of straight cyclopropane anesthesia only, not any cases in which other anesthetics were used in combination.

In these statistics the most noticeable fact is the large number of chest operations (124 out of 184 operations). This appears to us the field to which cyclopropane is most suited.

Of the seven deaths, it does not seem possible that cyclopropane was directly responsible in any case. It is conceivable that it may have been one of the factors involved in cases 4, 5 and 6. That any other anesthetic would have been better in these cases seems doubtful.

The number of cases showing mucus, cough, grunting, spasm and poor respiration does not seem remarkable in view of the large number of chest cases. The number recorded as showing obstruction, and probably those in which depth of anesthesia was not correctly gauged, seem less than actually occurred. Some cases doubtless were not recorded. The cases of cardiac irregularity are of interest, but the number does

TABLE 1

OPERATIONS

Thoracoplasty	117
Thoracotomy	2
Pneumonectomy	2
Lobectomy	1
Extrapleural pack	1
Partial excision pericardium	1
Thyroid operations (includes 4 total thyroidectomies)	33
Manipulations	4
Closure colostomy opening	3
Breast operations	7
Adrenalectomy	3
Miscellaneous (1 each)	10
	184

TABLE 3

Carbon dioxide absorption (all cases)	184
Intratracheal	21
Poor Induction	11
Poor Maintenance	19
Poor respiration (depressed, irregular, or jerky)	9
Spasm or stridor	7
Auricular fibrillation	1
Extra systoles	3
Pulsus bigeminus (possibly pulsus alternans)	3
Dropped beats	1
Tachycardia	1
Shock	1
Cyanosis	2
Grunting (all in thoracoplasties)	12
Bleeding more than usual	2

TABLE 2

DEATHS

Number of Cases 184
Deaths 7

Risk of Operation (Graded 1-4)	Operation	Time of Death After Operation	Cause of Death
1. Grade 2	Thoracoplasty	10 days	Postoperative empyema
2. Grade 3	Extra pleural pack	13 days	Pulmonary hemorrhage
3. Grade 3	Thoracotomy (carcinoma of lung)	Immediate (on table)	Air embolism (confirmed at autopsy)
4. Grade 2	Pneumonectomy	4 days	Pneumonia in other lung
5. Grade 4	Thoracoplasty	26 days	Pulmonary tuberculosis (gradual failure)
6. Grade 3	Closure colostomy opening (carcinoma rectum)	20 days	Heart failure (coronary sclerosis)
7. Grade 4	Adrenalectomy	13 days	Intestinal hemorrhage

not seem unduly large. This whole group did perfectly well otherwise except the case of dropped beats. This was case 1 of the deaths.

SUMMARY

Cyclopropane is a hydrocarbon anesthetic gas of great power, giving adequate anesthesia with concentrations in the vicinity of fifteen per cent. Its power and rapidity of action are of potential danger if it is carelessly used. In high concentrations it may have a deleterious action on the heart. Anesthetic mixtures are within the explosive range. The high percentages of oxygen which can be used with it make it of great value in chest surgery, respiratory obstruction, and some other conditions. Because it apparently combines low toxicity with fairly powerful anesthetic action it could conceivably encroach on the fields of virtually all the other commonly used anesthetic agents.

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THE MANAGEMENT OF ROENTGEN SICKNESS*

BY GEORGE W. HOLMES, M.D.,† AND FRANCIS T. HUNTER, M.D.†

WITH the more generalized use of the Roentgen ray in the treatment of neoplastic diseases, particularly with the development of the massive dose technique, the prevention and treatment of so-called "Roentgen sickness" have become of increasing importance. In the past few years the subject has received considerable attention; many theories have been advanced to explain the phenomenon and an equal number of methods of treatment have been advocated. With the exception of the suggestion made by Pfahler, in 1916, that unpleasant odors in the treatment room may play a part in causing the sickness, none of the various theories have been generally accepted.

At the Massachusetts General Hospital, in the last few years, we have gradually developed a routine management which we believe has definitely decreased the amount of sickness and which offers some alleviation of symptoms when they do occur. In our study of the problem it soon became apparent that there are, roughly, three types of sickness seen in patients undergoing Roentgen treatment. First, there is that group of cases which we have termed "toxic sickness", which shows marked nausea and vomiting following heavy doses of x-ray therapy over large masses of tumor tissue and which, being extremely sensitive to irradiation, rapidly break down and are absorbed during the course of treatment. This form of sickness is fairly well recognized and is, possibly, a toxemic phenomenon produced by the extra work thrown upon the liver in its effort to detoxify and deaminize partially split proteins. The obvious method of avoiding the symptoms of nausea and vomiting in such cases is to adjust the dosage to such a small amount that rapid breakdown of tissue does not occur. The second group we have classified as "psychic sickness" and this phenomenon occurs in patients who have been previously made sick by exposure to some form of irradiation, or occasionally in high-strung, nervous individuals who have been told by well meaning friends or nurses that x-ray treatment always produces sickness. Nausea or vomiting or both, usually occur in this group either while they are being treated or very shortly afterwards; and they belong to the group which complain of odors in the treatment room, of which Dr. Pfahler has written. The third group is by far the most important and may be called "true Roentgen sickness". The cause of this is not known with any certainty, but there is some evidence which points to temporary interference of liver function by heavy irradiation. It is this group that we particularly wish to discuss.

It is well known that the severity of the general reaction—that is, the proneness to develop anorexia, nausea or vomiting after irradiation—depends upon the size of the area and the part of the body treated, the amount of irradiation given at any one sitting, and the frequency with which the dose is repeated. It is also generally accepted that treatment over the abdomen or thorax is more likely to produce sickness than irradiation over other parts of the body. There appears to be some relation, too, between the severity of the reaction and the nearness of the treated area to the liver. If one groups the symptoms of Roentgen sickness and compares them with the symptoms seen in certain diseases which are known to impair the

*From the Massachusetts General Hospital, Boston, Massachusetts.

†Holmes, George W.—Roentgenologist, Massachusetts General Hospital. Hunter, Francis T.—Assistant Physician, Massachusetts General Hospital. For records and addresses of authors see "This Week's Issue," page 332.

function of the liver, there is a striking similarity. For example, in catarrhal jaundice and in Roentgen sickness the earliest complaint is that of fatigue, then loss of appetite, anorexia, and finally, vomiting. That inhibition of function occurs after irradiation is generally accepted. This is particularly true of the glandular structures of the body, a well-known example being the effect of irradiation on the parotid gland. The dose necessary to produce such inhibition of function is not large and hence it seems reasonable to assume that irradiation over the thorax or abdomen may temporarily inhibit liver function. It is also well recognized that an increase of carbohydrates in the diet or the use of glucose intravenously relieves, to some extent, the distressing symptoms often seen in acute impairment of liver function due to disease. It is largely on this assumption that we have adopted our routine of management of x-ray sickness.

(1) *The management of "Toxic Sickness".* The management of this group of cases seems obvious. The treatment consists in avoidance of large amounts of irradiation at any one time, particularly in cases with radiosensitive tumors. The initial dose should be quite small and every effort should be made to avoid a rapid breakdown of the tumor mass and the consequent rapid absorption of protein material by carefully regulating the daily dosage. Should very rapid absorption occur, on occasion true anaphylactic shock may take place, e.g., pulmonary edema, and the usual treatment for anaphylactic shock is indicated. When the symptoms seem to be more definitely those of toxemia, such as fever, leucocytosis, etc., stimulation of elimination, supportive treatment, fluid, rest, and at times, intravenous glucose may be used to advantage.

(2) *The management of "Psychic Sickness".* In this type of sickness prophylaxis is, again, more important than treatment. We do not believe that this type of sickness occurs except in persons who have previously been made sick by irradiation. If this assumption is correct, this type of sickness could be completely eliminated by careful dosage and proper selection of cases. If, however, it does occur and becomes unmanageable, it is at times even advisable to transfer the patient to another clinic, or to use a different form of irradiation such as radium, rather than high-voltage x-ray. Clinically, this type, as we have noted before, is characterized by rapid development of symptoms after or during treatment. In these cases the therapy should be given in the shortest possible time. It is surprising that in this group, as well as in true Roentgen sickness, the symptoms do not depend entirely upon the size of the dose given. Doubling the dose may not appreciably increase the severity of the nausea or vomiting. In some cases of this type we have found it advisable to keep the patient under morphine and scopolamine, and to give intravenous glucose by the constant drip method, completing the entire treatment within forty-eight hours. Recovery from the sickness does not appear to be prolonged and it may be much easier for the patient than to be permitted to have anorexia over a longer period of time. As Pfahler has pointed out, this group of cases is very susceptible to odors which may be present in the treatment room. These odors may be minimized by using equipment so constructed that the tube and high-tension wires are outside the room in which the treatment is given. In spite of these precautions, however, they are not always completely eliminated. When such a patient complains, it is at times advisable to have him report early in the day; for even with the best equipment, after some hours of continued use there will usually be some odor present.

(3) *The management of "True Roentgen Sickness".* If it is assumed that "true Roentgen sickness" is related to temporary disturbance of liver function by irradiation, there are certain routine measures which may be taken which may either prevent, lessen, or eliminate this form of sickness. Those patients who have recently undergone a major operation, those who have been for any other reason on a restricted diet, and those who are already nauseated from their disease are almost certain to develop "true Roentgen sickness". The condition of these patients should be improved as much as possible before beginning treatment. It is better to wait, after operation, until the patient is again on a normal régime, is taking liquids freely, and is able to take a reasonable amount of nourishing food. It must be borne in mind that, particularly in cases which have had abdominal operations, nausea and vomiting may be caused by subacute intestinal obstruction, and it is obvious that under such circumstances irradiation should not be begun until the abdominal condition has been surgically cared for.

In all types of sickness, particularly in "true Roentgen sickness", where heavy, prolonged treatment is planned, the carbohydrate intake should be increased. If possible, this should be begun two or three days before irradiation therapy is started. We have found that if a high carbohydrate diet is prescribed and the patient is given candy between meals and fruit juices sweetened with extra amounts of lactose, many patients may go through their treatment without any nausea or anorexia. If unable to take foods by mouth, at times we have given glucose intravenously before and during the treatment. The usual amount is 1500 cc. of five per cent glucose given twice a day by the intravenous drip method. The results with

this type of management have not been constant, but a sufficient number of cases have responded well enough to make us feel that it is of considerable value. In addition to the carbohydrate intake, it is important to keep the bowels moving daily, and to insure a good night's sleep, even if the use of sedatives is required. It has been our experience that when the cases are properly selected, carefully prepared for treatment, the proper dose prescribed to correspond with the patient's condition and with the size and location of the area treated, and a forced carbohydrate intake maintained "true Roentgen sickness" rarely develops and we are able to carry most cases through their series of treatments without discomfort.

CONCLUSIONS

1. There appear to be three distinct types of Roentgen sickness: (a) "toxic sickness"; (b) "psychic sickness"; and, (c) "true Roentgen sickness".
2. The prophylaxis and management of these three types of treatment have been discussed.

VORHEES BAG IN THE TREATMENT OF PLACENTA PREVIA*

BY MEINOLPH V. KAPPIUS, M.D.†

A STATISTICAL study has been made of all of the cases of placenta previa treated with Vorhees Bag at the Boston Lying-In Hospital during the period beginning with January, 1916 and ending with January, 1934. It was undertaken primarily for the purpose of affording comparisons between this and other methods of treatment for the same condition as carried out contemporaneously in the same institution, notably Braxton Hicks version alone or in conjunction with bagging, and Caesarean section.

This series includes 120 patients. Of these, nineteen had a complete previa, thirty-four partial and sixty-seven marginal. With few exceptions all of these patients were treated in a more or less routine manner on admission to the hospital. They were prepared for vaginal examination and under an anesthetic the finger of the examining hand was passed through the cervix and the inside of the lower uterine segment explored. There are, however, sufficient incidences of patients having been previously examined vaginally without inserting the finger through the internal os, or rectally, and the presence of a placenta previa overlooked, to make it appear obvious that such an examination is not only misleading, but dangerous to the mother and child. That a serious hemorrhage was not precipitated reflects upon either the gentleness or inadequacy of the examination, or both. One patient early in the series who had two such examinations in the Out-Patient Department was later admitted to the hospital in poor condition following a third attack of bleeding; the last a profuse hemorrhage.

Only two patients were admitted with vaginal packs, yet all but thirteen patients were in good condition on admission and in only one was there profuse bleeding. Aside from its inadequacy, this would indicate the lack of need for such packing, with its probability of contamination, if patients are promptly hospitalized and then examined after any abnormal bleeding in the latter months of pregnancy.

Although dealing with patients varying in duration of pregnancy from five months to term, in only five instances is the cervix described as being closed, but in spite of this, it evidently admitted the examining finger sufficiently for diagnostic purposes. In the majority of cases the cervix was dilated two fingers or more, sufficient for the performance of a Braxton Hicks version if such method of treatment had been elected.

Bags varying in size from three to six inches in diameter were used, the larger sizes predominating. It is of interest that in the eighty-eight cases so recorded, the bag was inserted extra-ovularly fifty-two times, intra-ovularly thirty-eight times. There is nothing to indicate that the method of insertion influences either the blood loss incident to the bagging or thereafter. Bleeding is usually well controlled, as indicated by the relatively small number of transfusions before delivery—a total of six—especially when it is recalled that thirteen patients were in only fair condition on admission.

A rather unexpected finding is that the length of time until expulsion of the bag was forty-eight minutes less when the bag was placed outside of the ovum rather than inside, five hours and thirteen minutes as compared with six hours and one minute respectively. However, since the bag was removed slightly more than twice as frequently when the membranes had been previously ruptured or the placenta perforated, it seems probable that labor was progressing unsatisfactorily or, as happened twice, bleeding was inadequately controlled. It is also to be noted, in determining a choice of methods, that of the seventeen patients who bled after the bag came out or was removed, thirteen had had an extra-ovular insertion. Incidentally, of the forty

*From the Department of Obstetrics, Harvard Medical School and the Boston Lying-In Hospital.

Read before the Obstetrical Society of Boston, February 27, 1934.

†Kappius, Meinolph V.—Assistant in Obstetrics, Harvard Medical School. For record and address of author see "This Week's Issue," page 232.

stillbirths of all weights, twenty-six occurred with an extra-ovular and only fourteen with an intra-ovular insertion.

TYPE OF DELIVERY

As shown by table 1, there were three sets of twins and one patient died intra-partum, making a total of 122 babies delivered. The preponderance of deliveries by version and extraction is noteworthy. It encourages three inferences: (1) that labor was artificially terminated because of fear of hemorrhage; (2) that actual hemorrhage made delivery desirable or imperative; (3) that the baby was, or appeared to be, in jeopardy. It is difficult to obtain statistical evidence regarding the actual degree of dilatation of the cervix when the bag was expelled, but it is recorded sufficiently often in this series to leave little doubt but that a large number of babies were delivered before the cervix was completely dilated, if such terms as, "almost fully" or "full dilatable" are assigned their proper meaning. This has an important bearing on the fetal as well as maternal mortality, and is a direct criticism of this form of treatment.

TABLE 1

TYPE OF DELIVERY

Method	Type of Previa			Total
	Complete	Partial	Marginal	
Normal	0	3	22	25
Forceps	0	1	11	12
Breech Extraction	5	6	6	17
Braxton Hicks Version	4	4	2	10
Version and Extraction	11	21	26	58
Total	20	35	67	*122

*Includes 3 pairs of twins (1 patient died, undelivered).

FETAL MORTALITY

Since the treatment in placenta previa consists in termination of the pregnancy irrespective of its duration, any study of fetal mortality, to be of comparative statistical worth, must of necessity consider not only the mortality in gross, but on a defined corrected basis as well, which requires also an analysis of results in different weight groups. A certain number of patients enter the hospital with dead babies. Some babies are obviously nonviable or present developmental deformities inconsistent with extra-uterine life. It is inaccurate for statistical purposes to determine nonviability by arbitrary standards, as occasionally a small baby survives. This applies to a 2 lb. 7 oz. baby in this series. For practical purposes, however, and as a guide to treatment, a baby under 4 lbs. deserves little consideration. To overcome the above difficulty, the fetal mortality has been computed separately for the different weight groups and this permits comparison with the fetal mortality for a large series of babies delivered by all methods in the same hospital over a like period of years.

TABLE 2

FETAL MORTALITY

Weight of Baby	Type of Previa			Total	General for B. L. H.
	Central	Partial	Marginal		
Under 3	100%	100%	80%	90%	88%
3-4 lbs.	100%	100%	71.4%	83.3%	44%
4-5 lbs.	—	66.6%	62.5%	63.5%	5%
5-6 lbs.	66.6%	50%	33.3%	40.0%	3%
Under 4	100%	100%	75%	83.1%	—
Over 4	50%	33.3%	24.1%	43.6%	—
Over 5	44.4%	27.8%	14.2%	21.8%	1.2%
All Babies	64.3%	53.3%	33.9%	52.8%	—

The figures as shown in table 2 are entirely on a corrected basis, monstrosities and babies in whom fetal heart sounds were poor or inaudible on admission, having been excluded.

It is to be noted that up to 4 lbs., 83.1 per cent of the babies were lost and this constitutes 34 per cent of the entire series of babies, hence different standards for the comparison would appreciably affect the fetal mortality as reported.

A comparison of the fetal mortality in babies of varying weights with that of similar groups for the entire hospital series indicates a striking discrepancy. Is the high figure in the former largely attributable to the type of delivery or to the underlying complication of pregnancy? There is clinical evidence to conclude that small babies in particular, who have been subjected to maternal hemorrhage have a high death rate irrespective of the type of delivery. Yet, it seems reasonable that a certain number of these smaller babies, and most of the larger ones, could be saved by Caesarean section.

To determine the accuracy of this assumption, a comparative analysis has been made of the fetal mortality in placenta previa when treated by Caesarean section,[1] in contrast to Braxton Hicks version[2], and Vorhees Bag. In a few cases the last two methods were combined. (Table 3.) In arriving at the corrected mortality the following babies were excluded: (1) monstrosities; (2) babies who died weighing

TABLE 3

COMPARATIVE TOTAL MORTALITY

Method of Delivery	Caesarean Section	Braxton Hicks Version	Vorhees Bag
Total No. Patients	62	71	120
Total No. Babies	62	73	123
Total Babies Lost	12	65	65
Gross Mortality	14.2%	89.8%	52.8%
Corrected Mortality	3.7%	70.0%	43.6%

less than 4 lbs.; (3) babies in whom the fetal heart sounds were missing or of poor quality when treatment was instituted. The advantage to the baby of Caesarean section is obvious.

MATERNAL MORBIDITY AND MORTALITY

Twenty-four and one-tenth per cent of all the patients had a febrile convalescence. (Table 4.) This is comparable to figures obtained in the same institution for Braxton Hicks version and Caesarean section in placenta previa. Of the complete previas, however, 47 per cent had a temperature of 100.4 or more for at least two days following delivery.

TABLE 4

MATERNAL MORBIDITY

Type of Previa	No. of Patients	No. Febrile	% Febrile
Marginal	65	11	17.0
Partial	32	9	28.1
Complete	17	8	47.1
Total	114*	28	24.5

*Does not include 6 patients who died intra-partum.

There was a total of eight maternal deaths in this series, a mortality rate of 6.6 per cent. It is significant that the deaths show no striking predilection to parity, type of previa or method of delivery. (Table 5.) One patient died undelivered. She was admitted in good condition and at no time was there undue bleeding. No autopsy was obtained but the death was characteristic of coronary embolism.

TABLE 5

MATERNAL MORTALITY

No.	Para	Type of Previa	Method of Delivery	Cause of Death
1	9	Complete	Version and Extraction	Shock and Hemorrhage
2	1	"	Version and Extraction	Hemorrhage
3	8	Partial	Version and Extraction	Sepsis
4	4	"	Version and Extraction	Shock and Hemorrhage
5	9	"	Braxton Hicks Version	Shock and Hemorrhage
6	4	Marginal	Version and Extraction	Shock and Hemorrhage
7	4	"	Undelivered	Coronary Embolus
8	17	"	Braxton Hicks Version	Sepsis

Of the remaining seven, five died of hemorrhage, or shock and hemorrhage, and two of sepsis. Three of the former entered the hospital in relatively poor condition due to loss of blood. All five of the patients died within five hours of delivery. In four, delivery was effected by version and extraction, in the fifth by breech extraction. Two patients in this group sustained lacerations of the cervix, which required suturing; two were examined for tears of the cervix and lower uterine segment but none found; while no mention is made of the other.

Of the two patients who died from sepsis, one had had two vaginal examinations under decidedly questionable conditions before admission to the hospital. The other was a patient who was admitted for bleeding of a slight amount and on examination a marginal previa was felt but no attempt was made to initiate labor. Two days later, the patient having slight pains without progress, a No. 4 bag was inserted, which was expelled the next morning. Evidently no further progress was made as a Braxton Hicks version followed by slow extraction was done. Considerable foul smelling lochia was noted and patient had a chill after delivery. The baby weighed 9 lbs. 1½ ozs. and was stillborn, the fetal heart disappearing a few hours before the bag was expelled. The patient died on the eighth day following a septic metritis, septicemia with abscess of the lung and embolic pneumonia.

Both of the deaths from sepsis occurred in patients having incomplete previas, whereas, all of the deaths in the complete previa group were due to shock and hemorrhage. This is comparable with Depken's[3] statistics, which, in a series of 204 placenta previas, 114 of which were delivered with Vorhees Bag, show deaths in the central previa group as due to hemorrhage in eight and sepsis in one, whereas, in the incomplete previa group eight deaths were caused by a sepsis and two by hemorrhage.

SUMMARY

In a series of 120 patients with placenta previa, eight mothers died, five from shock and hemorrhage, two from sepsis and one from coronary embolism, a maternal mortality of 6.6 per cent. Twenty-four and five-tenths per cent of the patients had a febrile convalescence. The fetal mortality for all babies who had good fetal heart sounds on admission (exclusive of 2 monstrosities) was 52.8 per cent and for all such babies over 4 lbs., 43.6 per cent.

CONCLUSIONS

The high fetal mortality among viable babies indicates that the use of the Vorhees Bag should not be the method of choice when dealing with a live viable baby. This applies equally to premature, immature and full-term babies irrespective of the type of previa.

The 24.5 per cent morbidity, as compared with 5 per cent for all patients in the hospital, indicates the much greater susceptibility of patients

with placenta previa to infection and the two deaths from sepsis emphasize its relative importance in contributing to maternal mortality in this condition.

A comparison between the results following the use of the bag and those obtained by Braxton Hicks version alone or following the bag, and Caesarean section, emphasizes suggestions for treatment previously outlined by Irving[4] and crystallizes the opinion that instead of allowing the type of previa encountered on examination to determine the method of treatment, all cases of placenta previa might better be considered as a group, all manifesting varying degrees of the same condition and the considerations determining treatment be limited to the condition of the patient and the baby on admission to the hospital, or when treatment can be instituted.

On such a basis the babies would fall into two groups: (1) fetal heart sounds poor or absent, or estimated weight of the baby less than 4 lbs. (for practicable purposes non-viable); (2) a living baby, weighing over 4 lbs.

The mothers can be subdivided into three groups (1) those in good condition; (2) those in poor condition due to loss of blood; (3) those potentially infected.

Mothers in good condition with a living viable baby should be subjected to Caesarean section in the interests of the baby; those with a dead or non-viable baby can be delivered through the pelvis by Braxton Hicks version if the cervix is two fingers dilated (rather than waiting for spontaneous expulsion of the bag and possible hemorrhage), then spontaneous delivery.

Patients in poor condition due to loss of blood are preferably delivered by Braxton Hicks version, or bagging and Braxton Hicks version, as it entails less shock than Caesarean section, permits a more effective method of controlling immediate blood loss and allows for an interval during which the patient's general condition can be improved by transfusion and other supportive treatment. The baby under such circumstances is not likely to survive, irrespective of the method of delivery.

This leaves for consideration the potentially infected patient who enters the hospital with a vaginal pack inserted under questionable conditions or following vaginal examinations carelessly made. Irrespective of the condition of the baby or type of previa the interests of this patient are best served by a Caesarean section followed by hysterectomy.

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FRACTURE OF THE EPIPHYSIS OF THE LESSER TROCHANTER OF THE FEMUR

BY SETH M. FITCHET, M.D.*

FRACTURE of the lesser trochanter of the femur is a relatively rare condition or else rarely noted or reported.

King[1] was able to collect but sixty-one cases from the literature. To these sixty-one cases, King adds one case of his own. The end results are known in fifty cases. Of these fifty cases, four died of other causes. Of the forty-six remaining cases in this series of fracture, all recovered fully irrespective of the varied methods of treatment employed.

REPORT OF A CASE

History. A boy fourteen years of age was making a standing high jump. He is not sure how he took off for the jump, but believes he landed first on his right foot and with his body hyperextended at the hips. As he landed, he felt a sharp pain which he localized chiefly on the lateral aspect of his right thigh in the lower third. He fell to the floor in pain. He was assisted to his feet and was able to walk with assistance, but complaining of pain still localized chiefly over the lateral lower third of his thigh.

Physical Examination. He was seen that night but examination was not satisfactory because of extreme apprehension on the part of the boy. Flexion of the thigh while supine was possible actively and passively to about forty-five degrees without undue complaint of pain. Beyond that point he could not go because of pain referred to the lateral aspect of the lower one-third of his thigh. While sitting with his legs over the side of the bed, he complained of pain in the same region and could not flex further. (Ludloff's sign.) Internal and external rotation were possible but painful. There was moderate spasm of quadriceps and adductor group of muscles. Abduction was resisted. Tenderness over all of the thigh was complained of, but was believed to be due to his apprehension since there was no localization. There was no swelling or discoloration. The left side was normal.

Fracture of the lesser trochanter was not suspected. No rupture of muscle could be made out. "Pulled groin" appeared to be the probable diagnosis, but did not satisfactorily explain the pain referred to the lateral aspect of the lower one-third of the thigh.

X-ray examination of the entire femur showed

*Fitchet, Seth M.—Visiting Surgeon, Orthopedic Department, Children's Hospital. For record and address of author see "This Week's Issue," page 332.

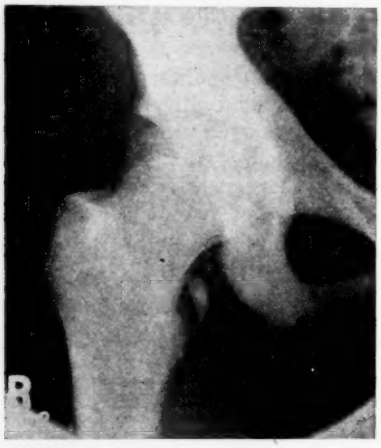
a fracture and displacement of the lesser trochanter, typically upward and medially, and no other pathology.

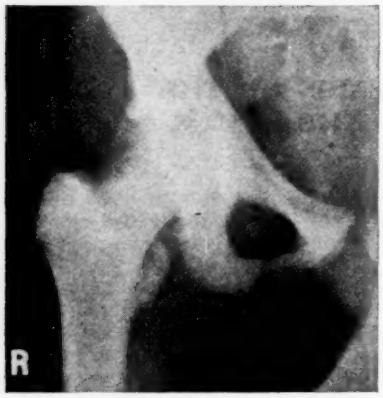
Treatment. A hip spica plaster cast was applied with the hip flexed at about thirty-five degrees, neutral as to abduction and adduction, and extending only to the level of the patella.

Exercises of the foot and leg and "setting" exercises of the muscles of the thigh were instituted at once and continued until the plaster spica was removed after being on for four weeks.

As soon as he had regained his balance he began to get about on crutches. Crutches were used for one week, a cane for an additional week, and then he was permitted to resume normal activities.

The x-rays show the separation of the epiphysis





and a satisfactory bony union two months after the injury.

The anatomy involved needs no comment except to remember that the powerful iliopsoas muscle has its principal insertion into the lesser trochanter and at times must exert a very powerful pull on this insertion.

Fracture of this epiphysis most frequently occurs between the ages of twelve and seventeen, before the epiphysis becomes united by bony union with the femur.

In all the cases except two, or possibly three, studied by King, the injury was in males. Usually it occurs during sudden hyperextension of the trunk on the thighs during some athletic activity. Since girls are taking a more active part in athletics, it is quite possible that the girls will show an increasing incidence of this injury as time goes on.

SUMMARY

1. A typical case of fracture of the lesser trochanter of the femur is reported.
2. The injury is correctly termed an "athletic injury" occurring primarily in children before the age of bony union of the lesser trochanter with the femur.
3. Diagnosis may be confused with "pulled groin" and entirely overlooked because of nerve distribution referring the chief complaint at a distance to the injury.
4. X-ray shows a characteristic displacement in the direction of the pull of the iliopsoas muscle, which is, of course, the displacement factor.
5. Because a small part of the combined tendon of the iliopsoas inserts into the shaft of the femur below the lesser trochanter, this displacement is limited in extent, since we have no evidence that this insertion is pulled off when the lesser trochanter is fractured.
6. The epiphysis will reunite no matter what treatment is instituted, or none, even though the epiphysis appears widely separated.
7. A logical treatment appears to be that of treatment of a fracture; immobilization in a plaster hip spica, in moderate flexion, neutral as to abduction and adduction, with the leg free to permit active exercises, with the usual routine of after-care employed in the treatment of fractures.

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THE NEW HAMPSHIRE MEDICAL SOCIETY

MEDICAL ECONOMICS*

BY N. B. VAN ETTEN, M.D.†

"PUNCH, my dear Copperfield, like time and the tide, waits for no man," said Wilkins Micawber, whose attitude of expectancy toward fortuitous circumstance is typical of large numbers of physicians today. Waiting for something to turn up may be characterized as dignified and masterly inactivity, but it will prove as disastrous to medicine as it was to Micawber. I fear that some very potent punch must be served to the medical profession if it shall ever be awakened to an appreciation of its collective responsibility.

Scientifically, medicine is glorious, economically it is improvident. Living in an industrial age it makes little effort to learn from industry practical methods for spreading the knowledge of its potentialities. Hiding its light under obscurant ethics, because of fear of commercializing individual abilities, it screens from publicity much knowledge of great popular value. Membership in a profession seems to have caused the physician to forget that everything in this country moves to the tempo of industry.

We struggle for employment or fall into the mass of those who cannot keep up with modern rhythm. From birth to death we all live by the clock. The physician rates no exception. The compelling pulse of progress beats also for him. If he fails, he cannot eat, cannot pay his rent, his fuel bill, his taxes, cannot insure himself a decent interment.

If modern society rates him successful, he must step faster and sleep less than others. He cannot be content with being on time, he must be ahead of time. For many of us 1934 and 1935 have been a whirl of desperation. of anxiety, of speculative wonderment. The Doctor of Medicine is accused of being socially uncoöperative and out of step. The Doctor of Philosophy is now trying to prescribe. Will the American people take his medicine? The bottle is labeled Socialism and State Medicine. The directions are, take it and like it. Socialism is defined as a theory of civil policy that aims at the public collective management of all industries. Socialized Medicine would be the public collective operation of the practice of medicine.

State Medicine is the operation of the functions or powers collectively of a state or nation in the control of the practice of medicine. These forms of collectives are claimed by their advocates to promise sure cures for all of the present economic troubles of the physician.

The struggle between individualism and collectivism is world-wide. The Soviet steam roller has been unsuccessful in ironing out the rising tide of capitalism. The Soviet tractor has failed to eliminate man power, individual farms producing a bushel an acre more than the highly mechanized State collectives. The German State has not profited from the murder and exile of German individualists, and I am told that the German physician has sunk to new lows under their present system of State Medicine, while misery, malingering and misrepresentation have risen to new heights. Fifty years ago students of medicine pilgrimaged from every corner of the earth to the feet of the German masters of science. No one goes now. The masters have been ruined by mass medicine and finally have been scattered by the lash of paganism.

A distinguished German professor, under the date of March 10, 1935, writes, "I hope that the curse of Health Insurance will be spared to the profession in the United States. It is the beginning of the end of independence and high moral standards. It has ruined the profession all over Europe." Before the institution of Health Insurance the German people averaged five and one-half days of annual sickness, a rate which has now risen to twenty-five and one-half days. This is a false index of morbidity because much of it is due to false certification by a demoralized medical profession. Contrast this with seven days annual sickness in the United States.

The American physician is having plenty of trouble, but at the same time is still giving the highest quality of service of which he is capable, and better service than is given in any other country in the world. It cannot be denied that American physicians are themselves measurably responsible for their difficulties; that those who have been making a living have not been properly interested in those who have not. It cannot be denied that the workers in Organized Medicine have been retarded in their work by a very large number of physicians who are so indifferent to their own welfare that they do not take the trouble to attend the meetings of their County Medical Societies, but, while being entirely uncoöperative, do not hesitate to revile their officers for involving American Medicine in an economic crisis.

It cannot be denied that conservative doctors, indifferent doctors, lazy doctors, foundation

*Read at the Annual Meeting of the New Hampshire Medical Society at Manchester, N. H., May 8, 1935.

†Van Etten, N. B.—Speaker, House of Delegates of the American Medical Association. For record and address of author see "This Week's Issue," page 332.

doctors, dissatisfied doctors, unethical doctors, socialistic doctors, communistic doctors, doctors of Public Health, doctors of Philosophy, are all taking a shot at Organized Medicine.

The conservative doctor resents the suggestion of any deviation from the traditions of medicine; any new plan for the payment of the doctor. He has nothing to offer but his satisfaction with things as they are.

The indifferent doctor does not care enough about economics to go to his County Society meetings and thinks the evolution of laissez faire will take care of things and that everything will go on about as usual, and that there is nothing he can do about it anyway.

The lazy doctor, who is largely responsible because he is so socially uncoöperative that he has taken no interest in the fact that lay organizations have taken away from the doctor the administration of several fields of medical service, notably that of tuberculosis and mental hygiene, will wake up long enough to ask why his elected representatives have permitted such an outrage upon the medical profession.

Then there is the doctor who is under such obligation to philanthropic foundations that he no longer speaks the language of the County Medical Society. He is so saturated with the social theories that are backed by rich laymen who employ doctors of Philosophy to do their thinking, that he has come to believe that medical organization is unimportant. He has no plan of his own but is willing to impose a copy of some of the foreign plans which are now regarded as unsatisfactory in the countries in which they are now operating. He is willing to impose those systems of the delivery of poor medical care upon the American people. He says that Organized Medicine is on its last legs and is now fighting a losing game with its back to the wall. He may be right. The strength of wealth accumulated through the devious control of useful everyday commodities by capital combinations may buy political control of an idealistic profession and destroy its value to the people and may dull its scientific interest. Some of these foundations have promoted valuable scientific operations, but it is an interesting fact that no great discovery has ever been evolved from these groups. Always and only the individual, by lone concentration of his energies, has produced the real discoveries that have changed and advanced basic science.

Then there are the doctors of undefined desires, who are dissatisfied with the status quo, which a colored clergyman defined as, "the mess we is in". Vulnerable doctors who try to justify themselves by asserting that everybody is crooked; all "merchants of health", all fee-splitters. They claim that medical ethics are mere façades to cover criminality, abortions, fraud and deceit. They would reduce everybody to their own depths of intellectual dishonesty. While they claim that Socialized Medicine will furnish panaceas for the plight of medicine, they merely mean that they see in such operations chances for their own parasitical existence.

Organized Medicine on the other hand, is trying to furnish constructive plans for the delivery of better medical service to all of the people and protection of the physician from bureaucratic domination. One hundred and fifty different operations are now proceeding in the United States, some of which are thirty-five years old. None of them involve either voluntary or compulsory insurance, but all of them are attempting to keep the patient in the hands of his personal physician and out of the hands of government.

The exigencies of the times demand the full coöperation of every licensed practitioner of medicine. Medical organizations have been too conservative. In order to avoid mistakes all of the units of Organized Medicine must work together, not only to resist the imposition of regimentative schemes upon the medical profession, but also to evolve plans which will satisfy the demands of society without sacrificing the dignity inherent in the delivery of service of high quality.

The American physician is entitled to an opportunity to advise and to propose any legislation concerned with the health of the American people. Change comes to the physician and he will welcome it. Social conditions change the manners and the conduct of all professions. The medical profession asks that its educational qualifications be taken into account in the development of new programs for medical service. The prospect of legislation for control of the delivery of medical service being written by lay foundation employees is a dismal one and should be vigorously protested.

The continued activities of some of the foundations have served a useful purpose if they have sufficiently irritated the medical profession to stand upon its own feet and repudiate the offensive actions of those non-medical dilettantists, who assume such superior knowledge of what is the best medicine for the American people. Private practice has such public consequence that there is need for Government umpiring, but the prospect of Government competition is appalling.

In the light of debasing foreign experience with State Medicine and in the light of our own experience with political bureaucracy, the physician who respects the high calling of his profession must meet the threat of an extension of State Medicine as a militant fighter for the maintenance as well as the elevation of his ideals. It will be a backward step into chaos if the Department of Labor of the United States should succeed in imposing upon the medical profession codifications such as those which have cre-

ated such confusion in industrial and agricultural production.

How shall the sick be adequately served? How shall the servants of the sick be adequately paid? These are the questions which should be adequately and unemotionally debated in every State and in every County before hurried national commitments are made. Quacks, charlatans and cultists have always marched side by side with the physician, and occasionally politicians, notably Bismarck and Lloyd George, have joined the long procession of those who have discussed these questions.

For a long time professional philanthropists have theorized and politicized, using physicians as unpaid pawns in their schemes of health promotion. They have promoted large scale institutional care of the sick with more or less success because the physician was always willing and anxious to be exploited. The physician, always dominated by scientific interest, was more concerned with the welfare of the patient than with his own comfort or prosperity. He has been improvidently generous.

All of modern medicine has been developed within the last fifty years, and the progress of the science of medicine has been so absorbing that the art and application of medicine has lagged far behind, and shows few signs of reaching its proper proportionate position unless or until a new type of physician shall have been developed. The physician now feels the pressure of Public Health education, and the reaction of his own work in preventive medicine which has eliminated diseases which formerly absorbed much of his effort. The physician has coöperated with the Government agencies in the attempt to eliminate communicable diseases and the absence of destructive epidemics has been of great economic value to the Nation. Unpredictable catastrophes have always been cared for by Health Departments, or by emergency organizations supported by generous people and by the free services of physicians with the hearty concurrence of the whole profession. The quality of medical care has been so remarkable that students generally concur in the opinion that nowhere are the citizens of any country better served.

The United States Public Health Service reports for the year 1933, the lowest general death rate ever recorded for this Nation. The Division of Vital Statistics of the State of New York reports for the year 1934 the lowest death rate for the State since such figures have been collected, "11.1 per 1000 of population". Infant mortality under one year was 52 deaths per 1000 live births. This figure has never been lower. The maternal mortality rate of 50 deaths per 10,000 total births was, with the exception of the rate for 1916, the lowest ever recorded. The scarlet fever rate was 1.2 per 1000, the second lowest recorded. New minimum rates were set for typhoid 0.6; tuberculosis 56.1; pneumonia 83.9; influenza 6.7 and cerebral hemorrhage 48.6. The total number of cases of diseases reported was lower by 40,000 than in 1933.

Such statistics do not support the claim made by some advocates of Social Security programs that large numbers of the American people receive no medical care. The fact that all morbidity and mortality statistics show general decline, except those relating to senescence and casualty, materially changes the health picture of the Nation, and confronts the physician with radically different medical and social problems to which he will be compelled to adjust himself individually and collectively.

The distribution of medical care, while admittedly faulty, is steadily improving. In New York State a few years ago, there was attempted a campaign for remedying the rural situation by planting physicians in small towns where there were no physicians. The few physicians so placed could not exist in those small places because the rural people drove right past their doors to the larger towns where they thought that they could find better medical facilities. In short, good roads largely solved the rural medical deficiencies in the State of New York.

In spite of the fact that very few physicians have ever been included among the wealthy classes, there has been very little complaint from physicians until the last five years. In our richest year 1929, only fifteen per cent of the physicians had net incomes above $10,000 and this group was largely composed of highly skilled specialists. At the other end of the financial scale fifteen per cent were said to be failing to make a living. As this was in our most prosperous season this fifteen per cent may safely be considered a constant figure and it is reasonable to assume that this group includes not only aged and physically incompetent physicians, but also those unkindly treated by fortuitous circumstances, and those who lack the will to work. During the present depressive cycle it is said that thirty per cent of the physicians are failing to make their current expenses.

Many limited specialists suffer extremely because many of their patients are unable to pay the specialists' fees and have returned to their family physicians or turned to free clinics. For several years physicians have complained of the intrusion of free or cheap clinics upon their private fields. They have complained of the corporate practices of institutions in delivering medical care, because in line with all corporate practices they have crowded out the small individual by restraint of opportunity. During this time physicians have continued to be the only double taxpayers concerned in the care of the sick, making their regular tax contribution, and at the same time serving tax-supported

institutions and public clinics without fee. In all of this public service, physicians are the only persons who work without pay. This inherited traditional service has now become so heavy that the physicians are stimulated to demand a change. If, however, economic conditions should tend to improve it will be characteristic for physicians to continue to give away millions of dollars in free service.

It has been claimed that the only way to secure payment for the physician for his free work is through the medium of sickness insurance. May I remind you that the foreign insurance schemes, as now operating, provide for workers only and not at all for the indigent who must be cared for by general taxation. The taxpayer pays nurses, social workers, and all other hospital servants. Because the physician is a higher grade servant of the sick, delivering a higher grade or quality of service would not seem to justify the taxpaper in expecting him to work without pay in a tax-supported operation.

There were more than 450,000 separate visits to the city hospitals in the city of New York during the past year, 1934, made by visiting physicians and surgeons. For this vast service not a cent was paid by the city of New York or by any one else; 2,290,000 treatments were given in out-patient departments to approximately 500,000 patients. These figures do not include an additional very large figure for the free service of physicians in the non-governmental hospitals which would have been obliged to close their doors if this free service had been discontinued. Who are asking the Government to interfere in the practice of medicine? Who are devising schemes for security through insurance or coöperative protection of medical service? The visible demand for Government medicine seems to come from the patrons of free hospitals or free clinics. The medical indigent, who may be defined as a person who cannot pay for medical care without denying himself or his family the necessities of life, is entitled to this care, but the generosity of the taxpayer is abused by a very large number of people who are well able to pay for the same kind and quantity of care they seek in the hospital.

Otherwise I do not hear people asking for free service. I see no letters in the newspapers complaining of the quality of medical care. There seems to be no public demand for Sickness Insurance. Public officials are not besieged with cries for public medicine. The common run of people seem to be satisfied with the medical care they now receive. Large groups such as the Parent-Teacher Organization or the Labor Federations are not asking for Sickness Insurance. Labor asks for equitable wages, and if, or when, labor secures them there will be little or no demand for any type of compulsory Sickness Insurance.

Our people are entitled to good medical care. Physicians want to give it, but are met with the resistance of indifference. This is well illustrated by the reaction of the people to campaigns for immunizations, which show only half-hearted coöperation under the stimulus of artificial excitement, and show that no lesson has been learned of the value of the health measure because, after the health campaign is over, immunizations of the untreated are neglected just as they were before. People want security; so do physicians.

Physicians want to be paid for what they do. Not necessarily single fees for single services. There is nothing new about an inclusive fee for a complete maternity service. There is nothing new about agreements for a term of service. Deferred payment is not new; doctor's bills are usually put in deferred files.

Many medical service plans are being tried. The Iowa plan is still developing in that State and some of its features are being used in other places. Other notable plans are the Alameda plan, the San Diego plan, the Vaughn plan now being tried in many cities, and the Wayne County plan which is interesting many County Medical Societies. None of these plans employ compulsory or voluntary insurance and all of them are designed to give the patient the benefit of the services of his own physician.

If these plans, or parts of them, work well they may be tried without committing the Government. If they fail they can be forgotten. The new plans of the California State Medical Society go practically all the way to compulsory Sickness Insurance with all of its governmental complications. If the Government sets up a machine to develop a system of service it must employ many people. It must pay them. The Legislature that votes the money must participate in its spending. If they spend money, bureaucracy is inevitable and, once embarked upon, is almost impossible to recall if it proves to be inefficient.

Who is asking for Sickness Insurance schemes built after the European manner? Or any other schemes which involve the necessity for permissive or mandatory legislation?

A group which is actively demanding Socialized Medicine is typified by a physician who calls himself a "Merchant of Health who boasts superior honesty in admitting high pressure salesmanship" in order to increase his practice. In a public letter to which he signs his name and address, he asserts that "thousands of x-rays are taken needlessly for no other purpose than to help the doctor to cover his expenses". He continues, "How many injections of one kind and another, how many laboratory tests, basal metabolisms, electrocardiograms are done daily when the physician knows beforehand that the reports will be negative, but makes the patient

take those tests for no other reason except the monetary reason? How many patients are referred to consultants and specialists so that the general practitioner will get his half, third, or quarter of the fees collected, depending upon the particular specialist?''

He denies that there is any such thing as a personal relationship between physician and patient and further continues, ''Let us stop pretending and face the facts. Is there any one that does not know the general practitioner's very existence depends to a great extent upon the rake-offs he gets from referring his patients to various specialists and laboratories?'' His remedy for these disgraceful conditions is the socialized operation of the practice of medicine, when there will be no cheating, when everybody will be compelled to be honest by the order of the State. Everybody will be amply salaried and have no worries. How can highly educated physicians, who have spent half of their lives struggling to enter the practice of a supposedly honorable calling, subscribe to such perversions uttered in the name of ''common honesty''? I know that there are a few physicians who are false to their oaths; false to their obligations as citizens, and the profession should be purged by their expulsion.

Another group of physicians who seem to desire Government medicine, are those who are already in it as practitioners of State medicine. Health officials who see an enlargement of opportunity in widened fields and employment in many bureaus. Few salaried officers can have a private practitioner's viewpoint; security colors their vision. Not a dazzling color, however, because the average Government medical employee receives so small a salary that it excites very little envy.

The most ardent advocates of Sickness Insurance are foundation directors, who have never practiced medicine, who cannot understand the confessor relationship between patient and physician, and who desire in their great wisdom to prescribe English medicine, German medicine, or Red medicine for the American people.

Our experience with the operation of compulsory industrial insurance has taught us that it is riddled with rackets. A few physicians, who are on the inside of the rackets, make inordinate profits while the rest of the profession and the injured workman get little or nothing out of this politically mismanaged piece of Government medicine. The contemplation of compensation operations will not inspire anyone to desire new forms of compulsory insurance until this present compulsory scheme shall have been so amended that labor, industry, and the physician, shall be guaranteed and receive a fair deal.

Amending legislation to eliminate some of the medical abuses passed the New York State Legislature at the last session, putting the selection of the physicians who may do compensation work in the hands of the County Medical Societies. Let us hope that the County Societies will rise to their new obligation so successfully that the Legislature will continue to listen to their demands for corrective legislation.

Although it may be possible that the insurance principle may be invoked in a final working plan for American medicine, let us avoid compulsory Sickness Insurance until every phase of the subject shall have been studied carefully and unemotionally with special reference to its adaptability to conditions of medical care in America.

Conditions of medical care have always been better in the United States than they were in England when compulsory Sickness Insurance was adopted there in 1911. National insurance appears to have improved the kind of medical service then given the British people, but Sickness Insurance there today does not prevent disease, does not take care of the indigent or reduce the costs of the care of this class of people and does not reduce morbidity. The average yearly sickness of the British people before 1911 was seven days; it has been extended to seventeen days, and is another false index due to false certification and malingering. Sickness Insurance has not reduced the costs of medical care but has merely instituted additional expenditures incident to the collections and to the distribution of these costs.

The Organized Medical Profession has been called reactionary, and static, and obstructive, because it does not welcome these foreign schemes with enthusiasm. These aspersions are unjust. The Medical Profession knows that changes in the delivery of medical service are as inevitable as the changes due to the extension of scientific understanding of disease. The profession is willing and anxious to promote changes, ardently desires improvement in the art and application of medicine, is generously public-minded, desires only the best of medical service for the American people, and asks that no governmental system shall be developed without full opportunity for free coöperation by American physicians.

During the last eighteen years there have been presented from time to time at the sessions of the House of Delegates of the American Medical Association various propositions concerning Sickness Insurance, and many forms of group or corporate or contract practice. All of these were seriously considered by reference committees and by the House of Delegates with an open-mindedness and a forward looking vision which displayed intellectual integrity. The insurance schemes have been all disapproved and constructive cautions have been given concerning contract alliances involving medical practice.

The American Medical Association suggests uniformity of action in setting up its ten-point basic principles, but has no desire to suppress the spirit of adventure which may inspire pioneers to look for new paths to new horizons. Our present economic policies will not determine the course of the world of tomorrow, indeed it is much more likely that some now unknown influence will change the current of our civilization.

The World War failed to make the world safe for democracy. Its great accomplishment is a seventeen year armistice during which the World has rearmed as never before in history. Democracy is on trial. Dictatorships of various colors are dominant. America must walk carefully if she will avoid the "isms" that are keeping European Nations in constant fear of explosion. Regimentation is the parent of "isms." The threat of bureaucratic domination must be opposed. Self-respect must be maintained by maintenance of a high quality of service regardless of material reward.

It is evident that Organized Medicine must array its forces aggressively, not only to improve the service to the sick, but also to improve the financial position of the physician. American ingenuity should be equal to the task.

American Medicine has a task. It must not only defend itself against destructive influences, but also must develop a constructive offensive behind which all of its forces must be massed. One of its first objectives may very well be seeing that the physician is paid for his free work which he has imposed upon himself so long that society in general, and hospital society in particular, has come to regard it as his obligation. Getting the physician paid for his work may involve a revolution in hospital organization, it may involve coöperative or other insurance schemes, it is likely to be a key which may be difficult to turn in a rusty lock, but once turned may open the door to hitherto unsuspected opportunity. I believe that the time is ripe to try it. I believe that the state of the country justifies it.

A current historian of excellent repute stated a few days ago that, at this time, in spite of our confusion and economic distress, the effects of which are keenly felt by most of us, there is greater general economic well-being in the United States today than has been enjoyed by any other nation at any time in history. It is difficult to believe this statement in the light of your personal experience, and yet there is statistical evidence to support it.

A sense of confidence in future security would be justified if the country could be allowed to follow in natural ways its upward trend, if fear could be lifted, and if the genii surrounding the central administration could be tempered by sanity. If they could be infused with some sympathy for the present and future taxpayers who must pay for the highly exciting music to which these genii are dancing.

While I believe that the Government pump priming is a retarding influence, I also believe that it cannot stop natural recovery and that the next decade is full of promise for those who have the will to work for the common good. The implication is especially pertinent to the economic situation of physicians who must drop all differences and work together.

Few physicians have ever acquired wealth from the practice of medicine. Many physicians are unable to maintain the overhead which they built up during the speculative decade of 1919 to 1929. Many physicians are failing to make respectable livings. Many physicians observe an increasing flow of paying patients to free hospitals. Many physicians are excluded from the opportunity to practice their profession in tax-supported hospitals.

Many physicians are on the outside looking in and will remain there until they unite in a demand as taxpayers for their right to participate in all of these public operations.

Fewer people are sick. Morbidity statistics are lowest in history. Fewer people are earning enough money to pay physicians. Fewer people are able to pay reasonable fees. Fewer people are able to pay any fee.

More people than formerly are visiting all sorts of cheap clinics. More counter prescribing by pharmacists prevails. More people eagerly accept and apply to themselves the medical advice of the radio broadcaster.

More patent medicines are taken. More physicians are being licensed than can be used by our citizens even if they were able to pay them; 125,000,000 people are served by 154,000 physicians, a ratio of 1 to 814.

The community is poorly served by crowded clinics. The community is defrauded by clinic visitors who are able to pay private practitioners. Community hospitality is abused by irresponsible non-residents. The community suffers from division of hospital support by too many hospitals or clinics too closely located.

The community has a poor return from its investment when hospital facilities are idle because of exclusion of practitioners who are qualified to use them. The community is poorly served by hospital practitioners who are disinterested because they work without pay.

All of these conditions can be cured by the concerted action of physicians, hospitals, welfare organizations, Health Departments, and an educated public.

These conditions cannot be cured by the imitation of any of the European systems of distributing medical care. They must be taken care of by ourselves, within our own medical organizations, and by the influence of sympathetic citizens.

By limiting the number of physicians newly licensed so that it may be possible for every com-

petent physician to make a living. By zoning cities and communities so that they may be served by small hospitals. By opening all tax-supported hospitals to all physicians who live within the hospital zone.

By payment of physicians for their work for the indigent in all tax-supported institutions. By payment of physicians for their services to all tax-supported indigents within or without hospitals.

By exclusion from tax-supported hospitals of all non-emergent patients who are able to pay a private physician.

By reform of the workman's compensation operation of compulsory industrial insurance in the interest of the worker and of the physician who takes care of him.

By development of the full values of Organized Medicine by the enlistment of every physician within the ranks of the County Medical Society.

By development of the values of the personal and family physician as the basis of medical service. By maintenance of the highest quality of medical care.

His age old experience and his education qualify the physician to meet a changing world and should qualify him for wise leadership of its evolution. The future of medicine challenges him. If he becomes indifferent, selfish, lazy, socially uncoöperative, he will write a sad chapter in medical history; if he becomes alert, awake to his opportunities to meet the new daily demands of the American people and give the most faithful service, the service of personal devotion to the science and the art of medicine, his glorious traditions will be multiplied, and he will meet the new day in the spirit of the old Sanscrit Salutation of the Dawn,

> "Listen to the Exhortation of the Dawn!
> Look to this Day!
> For it is Life, the very Life of Life.
> In its brief course lie all the
> Varieties and Realities of your Existence:
> The Bliss of Growth,
> The Glory of Action,
> The Splendor of Beauty;
> For Yesterday is but a dream,
> And Tomorrow is only a Vision,
> But Today well lived makes
> Every Yesterday a Dream of Happiness,
> And every Tomorrow a Vision of Hope.
> Look well, therefore, to this Day!
> Such is the Salutation of the Dawn."

DISCUSSION

PRESIDENT LORD: I will ask Dr. Timothy F. Rock of Nashua to discuss this paper of Dr. Van Etten's.

DR. TIMOTHY F. ROCK: When I was asked to discuss Dr. Van Etten's paper I was very naturally embarrassed because I realize that it would be presumptuous on my part to attempt it and I felt that whatever I might say would be an anticlimax upon a most interesting and instructive presentation of the subject by an authority. We are all greatly indebted to you, Doctor.

I appreciate that the Doctor has given most generously of his time and talent to study and analyze an abundance of information and of misinformation upon the subject of Medical Economics, or Socialized Medicine or whatever you may wish to designate State Medicine, and has tried to separate the good from the bad, that those who wish it, may have a clear concept of the subject and that as much of State Medicine as may be forced upon us shall be made as distasteful to the profession as possible.

This Society appreciates the conscientious and tireless work of your Committee of the House of Delegates to preserve and buttress the profession against the insidious advance of the political control of the practice of medicine because such control, unbridled, may become political despotism. I feel that I express the hope of this Society and of the thinking people of our State that the President's Committee on Economic Security at Washington shall be persuaded that relief of human suffering through sickness and the ministrations and administration of medical service shall continue to be the responsibility of the medical profession, free from any group politically conceived, politically born and nourished, and maturing powerful and arrogant to our disadvantage by the spending of political favor for which we shall pay an unjust tax.

I am sure it has become a commonplace to feel that those in Washington have the answers for all the questions upon all of the problems of the day and that it is "Love's Labor Lost" for us to attempt to maintain the practice of medicine upon the high ideals of individual scientific initiative, professional ethics and patient and physician relationship of the past if it fails to square with the New Deal program. But I am not so sure that the New Deal answer to our problem is correct. It may be that Socialized Medicine, or any other form of compulsory sickness insurance, which makes for a mighty political influence, while making near serfs of the doctors and drones of the willing people, is not the right answer to the problem of Medical Economics.

State Medicine, so-called, seems to have had its start in Germany in 1883 when Bismarck initiated it solely as a sop for political unrest. It was introduced in England in 1911 by Lloyd George, also as a stop-gap for political unrest. Wherever it exists, its background is the same. Even in industry, sickness insurance, whether contributory or not, is fundamentally a political factor against industrial unrest. And, whether you recognize it as such or not, we have State Medicine in this country today and in this State, and, whether it is called Welfare or Federal Emergency Relief Administration or Economic Security or anything else, its purpose is unchanged and its dangers every bit as pernicious and malignant as State Medicine in any form anywhere.

I presume that all of us realize that in England, where State Medicine is perhaps less in disfavor among the physicians than in any other country, the average annual income of all panel doctors is $2000, out of which must be paid the usual expenses of a medical practice, and that this income is greater than in other countries having State Medicine. While it is true that a panel doctor is permitted to have a private practice in addition to his insurance work, few have the time for any such practice.

If that, or anything resembling it, is what new thought in this country wants, we have it and like it. You realize also, I think, that State Medicine or insurance practice means mass treatment, the cough and the bottle. If that is what the people of this country are willing to take, they may get it. If unemployment relief is made a part of any medical prescription, the multitude of poor souls too ill

to work will increase many fold, just as industry finds a disconcerting incidence of disability among those entitled to sick benefits as against the better health of those not so privileged and a dramatic recovery from disability, beyond the power of medical science, when benefits cease.

If these are among the fundamental goals of Economic Security that are to be saddled upon the backs of the people of this country, they may be achieved most speedily through State Medicine, or Socialized Medicine, or any other catch-phrase designation you wish applied to a politically controlled practice of Medicine.

Vital statistics do not reveal any dramatic decrease in mortality or morbidity in Hillsborough County of this State in the last year or so. Yet the cost of medical care put upon the county has increased from an average annual expense of $3000 up to two years ago, to $40,000 last year. And for what? Sickness among our people has not increased to that extent, any more than that outlay has improved the health and happiness of our people. And the worthy poor were always adequately and conscientiously cared for.

It would seem that a system is developing similar to that in Germany where the number and remuneration of executives, social workers, clerks and others engaged in the care of the sick, far exceeds the number and the recompense of the doctors who treat them. It is not impossible that State Medicine, now an actual, vital, living thing under the Federal Relief Administration is, or will become, the kind of State Medicine which the most thoughtful element in the profession has long and earnestly opposed.

I do not intend the inference that there is nothing good for anybody in State Medicine as it lives today in this State, nor do I feel that every doctor and every citizen will view it, eye to eye, with me. I feel very strongly, however, that whatever of good there may be in it today is unreal and obscures its ultimate disadvantages to the physicians, professionally, scientifically, and economically; obscures its degrading influence upon the morale of our people, and obscures the stifling burden which taxation for its wasteful operation will put upon all business and upon all the people.

Out of our experiences with State Medicine as it is practiced in this State, and I repeat that it is State Medicine, a segment of our profession may be economically encouraged because some recompense accrues from a service that would otherwise be gratuitous. This may simulate a feeling of security. Let me repeat, however, what I have said before, that herein lies a real danger to the whole profession, because the State politic and the citizen may become accustomed to medical service at a cost that does not and cannot repay the doctor for the careful conscientious attention he should devote to each patient, and these may well demand medical service at the same cost in a better day. It is also conceivable that present payments may be reduced as politically conscious administrators need to curtail expenses, or look with envy upon the rising income of the physician as his number of calls ascend, just as they have always done under similar systems subjected to the human impulses of doctor and patient alike.

When the time comes, as it came under every system of State Medicine, that the doctor is placed upon a wage or per capita basis, he may find his average payment something like *five cents* per call, as it has just worked out to be in a Massachusetts community.

I have it upon the word of physicians engaged at the present time in insurance work and in industry, that the amount of work, often to the point of fatigue, demanded of them in return for their more or less security of income, stifles initiative and deprives them of the opportunity for self-improvement. Such is generally the experience of panel or insurance doctors in their countries; such may well be the unhappy lot of those of us who feel complacent toward our present form of State Medicine, unmindful of the cancerous nature of its germ cell left unguarded.

We must put forth every effort and power at our command to the end that the practice of medicine under any form of political subsidy shall end with the emergency responsible for its birth. Let us hope that out of all the chaos surrounding the subject of Medical Economics some plan, that will be fair and just to the patient, to the physician, and to all the people who pay the bill, will be designed eventually.

All of us who are zealous for the future of our profession, that its ideals may continue and its achievements multiply for the benefit of all within our borders, rich and poor alike, hope that the practice of medicine may be allowed to live as an honorable profession, free from political influence or control; that it may not become a program of the cough and the bottle, or be divided in first and second rate doctors.

We thank you, Dr. Van Etten and your Committee, for your diligent work in our best interests.

PRESIDENT LORD: I will ask Dr. Metcalf to continue the discussion on this interesting subject of "Medical Economics of 1935."

DR. CARLETON R. METCALF: Your Committee on Legislation, which has had under its wings the problems in medical economics during the past year, has been concerned about possible adverse legislation, both from our own General Court and from Washington.

The legislation which concerned us most here was the so-called Epstein Bill, a radical bill for health insurance or sickness insurance, which was, in reality, introduced into the Legislatures of more than twenty states this past year. This particular bill came from an organization called the American Society for Social Security, which has about five thousand members, and which has its headquarters in New York.

We estimated that if this bill were passed in New Hampshire, it would cost about six million dollars to provide an inferior brand of medical practice in a state where the medical cost at the present time is about three million dollars. If any of you are familiar with bureaucracy, I think you can imagine what was going to be done with the extra three million dollars. When a group of five thousand enthusiasts try to put something over on the other 120,000,000 people in the United States, it looks to me like a very shining example of the tail trying to wag the dog.

This bill was not introduceed in the New Hampshire Legislature, and while Dr. Van Etten and his colleagues in New York State have been locking horns with Mr. Epstein, we were ignored. So there are some advantages in being an inconspicuous state.

The other thing that we were concerned about was government ownership of medicine, emanating from Washington. It seemed to us that the more abundant life, which is about to be bestowed on the citizens of this country, was coincident with a less abundant life for physicians.

Your committee tried to counteract these two methods of legislation by talking before the county societies, by giving radio talks, by sending out releases to the newspapers and by an effort to affiliate with other groups who were similarly concerned

—with the dentists, with the 65,000 farmers in New Hampshire, with the employers, and with the employees.

Your committee objected to: first, compulsory insurance; secondly, insurance controlled by the government, and thirdly, the supervision of lay officials. You will find that those are the three keystones of all systems of medical insurance in the different European countries; compulsion, government control and lay supervision.

Your State Society and your House of Delegates followed the A. M. A. in a constructive program which could be controlled and supervised by the doctors. But they tried to point out the dreary inefficiency of the systems which prevailed on the continent of Europe.

A few weeks ago I had the pleasure of talking with Dr. Gros, who is in charge of the American Hospital in Paris, and I asked him how the French system was working out. He said that the doctors didn't like it, and that the patients didn't like it. He told me that he had to contribute $15.00 a year for his cook, she had to contribute $30.00 year, and the government contributed another $15.00 a year, a total of $60.00 a year. Recently his cook injured a finger; she went to the clinic to have it fixed, and sat around several hours, before a young doctor came out and put a splint on the finger. He said, "I lost her services for six hours. I am going to hire one of my friends and pay for it myself the next time she hurts her finger."

Our efforts may have met with some success. Both of our Congressmen, at any rate, seem to be with us. Our former Governor and present Congressman, Charles W. Robey, has written to me:

> "I have, for some time, been interested in some form of old-age pension and unemployment insurance, and have been sympathetic therewith. I believe these two salient points are real objectives, and the matter which you oppose, namely, sickness insurance, I shall oppose if an opportunity comes to vote against it."

Congressman Rogers wrote in a similar vein.

Now, I think it is obvious, from what you have heard today, that it is up to us to present a united front on this matter. And I hope that every one of you will impress the views of the medical profession not only on your patients but on the respective members of the largest legislative body in the world.

PRESIDENT LORD: Does Dr. Van Etten wish to add anything to what he said?

DR. VAN ETTEN: *Mr. President*—Fortunately, the Epstein Bill slept in committee, and is still there. The Epstein bill was in our State a very pernicious one, and was introduced in Massachusetts and in one other State, in which it failed. I feel that we were fortunate this year in getting a little breathing spell, but I feel that before the next session of the national legislature, we shall all have to become personally and coöperatively active in our opposition to that piece of legislation which has in one form or another been before the medical profession insidiously in one place and then in another and now out in the open, and we shall have to be very much alive before the organization of the next national legislature in order to prevent the attachment of this particular type of legislation to unemployment insurance legislation.

It is exceedingly important that every doctor should study these things out for himself. But it is even more important that every doctor should appreciate his potentiality as a citizen, and as an informed citizen, he must accept his responsibility, to tell all of the people with whom he comes in contact the real truth about these matters. The people must be educated. The people will be sympathetic, if they know anything about it. The great trouble with the medical profession is that they haven't known anything about it; they haven't paid any attention to it at all. They are interested in scientific medicine, and aside from that, I do not think that they read their medical journals very much. They read just the things that they are interested in, if they open the journals at all. They don't even go to society meetings except for interesting programs.

When the question of economics comes up, if they know about it in advance, there will be a corporal's guard in attendance. Really, they are not interested in anything but scientific medicine.

That, gentlemen, should be a thing of the past. Medicine is changing very much.

The whole scheme of the practice of medicine will be changed in the future, and if the medical profession doesn't realize its economic problem, it will soon be facing economic slavery.

MISCELLANY

ANNOUNCEMENT

The Hitchcock Clinic, Hanover, New Hampshire, announces the association of Dr. M. Dawson Tyson.

RECENT DEATH

MITCHELL—ABRAM WHITTEMORE MITCHELL, M.D., of Epping, New Hampshire, died at the Elliott Hospital, Manchester, July 31, 1935, following an appendectomy. He was born in 1862. He graduated from the New York University Medical College in 1887. He began practice in Epping in 1892 and was the second oldest ex-president of the New Hampshire Medical Society and a Fellow of the American Medical Association. He was a thirty-second degree Mason, and had served in the New Hampshire Legislature in 1897 and 1899.

Dr. Mitchell is survived by three children. His wife died a few months ago while on a trip South.

CASE RECORDS
of the
MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

CASE 21331

PRESENTATION OF CASE

A fifty-three year old American housewife entered complaining of shortness of breath of two weeks' duration.

One year before entry she began to feel tired and weak. She suffered from shortness of breath at intervals, especially upon moderate exertion. Her physician put her on digitalis which he increased in amount as her symptoms increased in severity. She lost about forty pounds in weight during the next six months. A few months after the onset her urine began to have a disagreeable odor but this passed off shortly. A few months later her urine was thick and cloudy on one occasion. Three weeks before admission her weakness and shortness of breath increased. She became dizzy on one occasion and had nausea and vomiting. She stopped her medication and since then the vomiting had not recurred. She had had two attacks of nocturnal dyspnea. During the past two weeks she was bedridden and had shortness of breath at all times except when sitting up. She soon began to have a dry cough. There was no history of edema. During this illness she had many severe headaches behind her left eye. She had nocturia twice a night.

The family, marital and past histories are noncontributory. She had had twelve pregnancies. Nine children were living and well, two died in infancy, and there was one miscarriage. The menopause occurred five years before admission.

Physical examination showed a well-developed and nourished woman in a semi-reclining position, breathing very rapidly and with much effort. Her skin was flushed and slightly blue, her lips and fingers cyanotic. Her breath was not uriniferous. Her hands and feet were cold and clammy. The right fundus showed blurring of the disc margins. The left, however, was clear. In both there was marked narrowing and tortuosity of the arterioles with many small irregular hemorrhages and yellowish exudate. The veins were dilated. Scattered throughout both lungs, most numerous at the bases, were many moist râles. There were signs of fluid at both bases. The heart was slightly enlarged, the left border of dullness being 9 centimeters to the left of the midsternal line, 3 centimeters to the right. The midclavicular line was 8 centimeters from the midsternal line. The sounds were forceful and the rhythm regular. The blood pressure was 210/120 with pulsus alternans between 210 and 190 millimeters. The abdomen was slightly distended. The liver edge was felt five fingerbreadths below the costal margin. It was smooth and slightly tender. The spleen was felt three fingerbreadths below the costal margin and was slightly firm and non-tender. There was slight pitting edema of both legs and very slight edema of the sacrum.

The temperature was 98°, the pulse 102. The respirations were 20.

The urine was cloudy and had a specific gravity of 1.012 to 1.014, a slight trace to a huge trace of albumin, and an occasional white blood cell. Examination of the blood showed a red cell count of 7,800,000, with a hemoglobin of 95 per cent. The white cell count was 14,300, 90 per cent polymorphonuclears. The nonprotein nitrogen of the blood was 77 milligrams. A Hinton test was negative. The oxygen capacity of the blood was 29.6 volumes per cent. The volume of the cells was 66.7 per cent. The volume index was 1.05, the color index 0.99. The stools were negative. An electrocardiogram showed normal rhythm, rate 105, slight left axis deviation, prominent S_2, inverted T_1 and T_2, low upright T_3, inverted P_3 and absent Q_4. The serum protein was 5 per cent.

X-ray examination of the chest showed some fluid in both lower lung fields which prevented demonstration of the exact position of the diaphragm. The heart was slightly enlarged.

The red cell count remained elevated. She was venesected several times with marked relief of her dyspnea. On the tenth day she was started on phenylhydrazine which was given for ten days, a grain and a half each day. She developed a carbuncle on her left buttock which was poulticed. On the fourteenth day she suddenly developed what was called acute pulmonary edema. Her blood pressure was 270/170. A venesection of 500 cubic centimeters was done and she was put into an oxygen tent. She felt well following this. A week later the abscesses of the left buttock were incised and drained. Approximately one month after admission she began to complain of severe left upper quadrant pain. Her temperature rose to 103°. There were tenderness and spasm in the left upper quadrant. A friction rub was heard over her spleen and in the left lower chest posteriorly. A rectal examination at this time was negative. Her red blood cell count had by this time decreased to 3,500,000 and her white cell count had risen to approximately 30,000, 90 per

cent polymorphonuclears. She continued to do poorly, the temperature remained elevated, the abdominal pain did not abate, and she died approximately five weeks after admission and nine days after the onset of the abdominal pain.

Differential Diagnosis

Dr. Chester S. Keefer*: As one reads the story of this patient's illness it seems clear that the main diagnostic problem is the interpretation of the episode that began nine days before death. Briefly, we have a woman who had the symptoms of heart failure which were progressive over one year. This was characterized by exertional, paroxysmal and continuous dyspnea, and orthopnea, without conspicuous peripheral edema. In addition there had been loss of weight, unilateral postorbital headaches and nocturia. The dizziness, nausea and vomiting apparently followed digitalis therapy since they disappeared following the discontinuance of the drug.

The physical examination revealed a woman in considerable distress with dyspnea, orthopnea, cyanosis, hypertension with pulsus alternans, pulmonary congestion, bilateral hydrothorax, cardiac enlargement, an enlarged liver and spleen, and edema over the sacrum. The changes in the ocular fundi were consistent with a vascular retinitis, but in addition there was haziness of the right disc and engorgement of the veins.

The laboratory examinations revealed polycythemia and a slight leucocytosis, moderate nitrogen retention, albuminuria with a reduced specific gravity. The electrocardiographic tracing was consistent with that found in patients with hypertension and sclerosis of the coronary vessels supplying the anterior wall of the left ventricle with myocardial fibrosis.

From these findings, one would not hesitate to make the diagnosis of vascular disease with hypertension, cardiac insufficiency and polycythemia vera.

The course of the illness in the hospital was punctuated by three episodes: (1) the development of acute pulmonary edema which was a sign of progressive heart failure; (2) the appearance of a furuncle on the buttock; and (3) the attack of abdominal pain, localized in the left upper quadrant and accompanied by tenderness and spasm of the abdominal wall, a friction rub over the spleen and in the lower part of the chest, fever and leucocytosis.

When a patient with heart failure complains of pain in the left upper quadrant one naturally thinks of infarction of either the lung or spleen. In this patient, the presence of a friction rub over the spleen, without cough or expectoration, would lead one to suspect that the infarct was in the spleen.

When a patient with polycythemia complains of acute abdominal pain one entertains the possibility of either a vascular accident or a perforated gastric or duodenal ulcer. Both conditions are fairly common in this disorder. Of the vascular accidents, one has portal, splenic or mesenteric thrombosis, or thrombotic occlusion of one of the branches of the coronary or splenic arteries. The latter is more common. From the story and course of events it would not be possible to make a diagnosis of occlusion of one of the large veins mentioned. However, there is no serious objection to the diagnosis of infarction of the spleen. If this line of reasoning is correct it is necessary then to explain how this infarction arose. Two possibilities I have mentioned already, but there is a third; namely, a septic infarction of the spleen following the infection of the buttock. This is suggested by the presence of high fever and leucocytosis, accompanying the signs of splenic infarction. It is not absolutely diagnostic, however, since bland infarctions of organs such as the kidney or spleen may be accompanied by fever and leucocytosis. As a rule, however, the duration is somewhat shorter than nine days unless there is a superimposed infection.

The leucocytosis might be explained on a basis of the phenylhydrazine therapy. Generally speaking, the increased leucocytosis produced by phenylhydrazine does not persist more than ten days after the drug has been discontinued, so that it seems unlikely that the phenylhydrazine treatment can account for the leucocytosis in this case, since it was discontinued approximately ten days before the onset of the pain in the abdomen.

There remains for discussion the question of the relation, if any, between the polycythemia and the cardiac insufficiency. Polycythemia is seen in certain types of congenital heart disease, and in the heart failure resulting from chronic pulmonary fibrosis or kyphoscoliosis. In this particular case these conditions can be excluded at once. There are a few patients, however, with polycythemia and hypertension in whom the symptoms and signs of the disease may be predominantly those of the hypertension. In these cases it is necessary to exclude instances of suprarenal and hypophyseal tumors. Once this has been done, there remains a group of patients with hypertension and polycythemia in whom the precise relationship between the two conditions is difficult to define. As a rule the spleen is not enlarged and the blood pressure may be lowered following the reduction of the red blood cells. In the present case I am unable to see how the cardiac insufficiency and the polycythemia are related to a common cause, unless one assumes that the generalized vascular disease which is so common in these cases is the primary lesion and the polycythemia is secondary to diffuse vascular lesions of the bone marrow which produce anoxemia and a stimulation of red cell production.

*Associate Physician, Thorndike Laboratory of the Boston City Hospital.

X-ray Interpretation

Dr. George W. Holmes: The x-ray film shows a rather characteristic picture of a somewhat dilated heart with passive congestion in both lungs. The condition in the lungs obscures the outline of the heart to such an extent that one would not be able to say whether this was a dilated hypertensive heart or some other heart lesion. There is also evidence of fluid at the bases.

Clinical Discussion

Dr. William D. Smith: This case has been discussed so adequately that there isn't much to say. The consensus of the service was that she had polycythemia vera and then the question came up whether the hypertension might be secondary to the polycythemia.

Dr. Grantley W. Taylor: We saw this patient on the surgical service because of her carbuncles, which we treated. Then this final complication developed. We found very little else but what is stated here, tenderness, spasm, high white cell count, elevation of temperature and the complaint of a good deal of pain on the patient's part. The onset was very abrupt, so much so that although we considered the possibility of metastatic abscess of the spleen we were inclined a little more to consider that it was a splenic thrombosis secondary to polycythemia rather than bacterial infection. The question arose whether exploration was called for, if so, what we would attempt; and there again we did not have a very definite plan of campaign unless we found an abscess. We thought abscess was an extremely unlikely possibility. She was transferred back to the medical service and I do not believe we saw her again after that original episode.

Dr. Francis T. Hunter: I want to call your attention to the fact that we are having, with Dr. Holmes' assistance, rather good luck with radiation of patients with polycythemia vera. My experience with phenylhydrazine has been very unpleasant because in order to get results you have to push up the dose almost to the point of nausea. The two cases we have radiated have had counts of eight or nine million. We gave them spray radiation, a rather enormous dose for three weeks, and after months of rest when the count did not change we repeated. These two patients—one two years now, the other eighteen months—have had no change in their red count—from four to four and a half million. I think this method of treatment offers something to these people that we have not been able to give previously.

A Physician: What white cell counts did your cases have?

Dr. Hunter: In the neighborhood of fourteen, fifteen or eighteen thousand. They came down to six thousand.

A Physician: Did any of the cases have a leukemic blood picture?

Dr. Hunter: No, the leukemias have not done nearly so well.

Clinical Diagnoses

Polycythemia.
Splenic thrombosis.
Carbuncles.
Mesenteric thrombosis?
Pylephlebitis?
Cardiovascular renal disease.

Dr. Chester S. Keefer's Diagnoses

Hypertension with arteriolar sclerosis.
Coronary arteriosclerosis with myocardial fibrosis.
Cardiac insufficiency.
Benign nephrosclerosis.
Polycythemia vera with enlargement of the liver and spleen.
Splenic infarction with perisplenitis due to thrombotic occlusion of a branch of the splenic artery.
Splenic abscess?

Anatomic Diagnoses

Polycythemia.
Splenomegaly.
Septic infarcts of the spleen.
Thrombosis of the splenic artery.
Pulmonary abscesses, multiple.
Pleuritis, acute fibrinous.
Carbuncles of left buttock.
Cardiac hypertrophy, hypertensive type.
Benign nephrosclerosis.
Leiomyoma of the esophagus.

Pathologic Discussion

Dr. Tracy B. Mallory: The autopsy was characterized by a single outstanding feature, a very large spleen weighing 750 grams. It showed very nearly complete infarction although the infarcts were multiple; so numerous as to be contiguous, with practically no normal tissue between them. We found the splenic artery completely thrombosed, a part of the thrombus evidently being quite an old affair since it was fibrous and in places calcified. Then there was a fresh, completely occluding thrombus which I assume was terminal and which accounted for the last episode. In all probability she had had at least one preceding attack of splenic thrombosis, a matter of months or years before. The infarcts in the spleen had not as yet broken down but the amount of leukocytic infiltration in some places suggested that there was probably a septic element to them, but there certainly was nothing that one could call an abscess and nothing that could have been surgically drained. She did have definite abscesses elsewhere, most noticeably in the lungs, which were

peppered with small ones varying from a millimeter up to a centimeter and a half in size. One or two of these had evidently in the last few hours of life broken through into the pleural cavities. An acute fibrinous pleuritis presented in both pleural cavities but was as yet not very extensive.

The stomach was very carefully examined for evidence of present or past ulcer and no acute erosions and no scars of any sort were found. We did find incidentally—nothing of any clinical importance to the case but rather unusual—a leiomyoma of the lower end of the esophagus, a small one about 2 centimeters in diameter.

The heart weighed 350 grams which is slight hypertrophy for a woman. The coronary arteries were capacious and practically free from atheroma. The kidneys were definitely small, weighing only 175 grams, showing as Dr. Keefer predicted a fairly marked degree of benign nephrosclerosis.

The sepsis had made its way to the head also and acute suppurative sinusitis was found in the left frontal sinus and in the ethmoid, with a somewhat more questionable lesion in the right frontal.

Microscopically the feature of greatest interest is the bone marrow which showed a very marked degree of hyperplasia not only in the usual blood forming areas, that is the vertebrae, ribs and various flat bones, but also in the portions of the marrow usually composed only of fat tissue, for instance in the middle of the femur where the marrow was deep red in gross and microscopically the fat cells are replaced by active hematopoiesis. The excessive blood formation is not limited however to the red cell series as it would be in pernicious anemia for instance. Red cells, white cells and megakaryocytes seem to be present in normal proportions but in greatly increased numbers. Moreover, the differentiation of all the cells seems to be going through to conclusion. One has no striking predominance of immature cells, such as one finds in either pernicious anemia or leukemia. The vessels of the marrow with ordinary stains show nothing abnormal. It is possible that with special stains we might bring out some arterial thickening but I have not been able to demonstrate it in our ordinary sections.

Dr. Holmes: This film was taken two months before. It is quite possible that the abscesses that you found were not present at the time.

Dr. Mallory: No, I think the abscesses developed only in the last week or two.

Dr. Arlie V. Bock: I should like to ask Dr. Keefer to explain the electrocardiographic findings in view of your findings.

Dr. Keefer: I am not able to do that. Have you any explanation?

Dr. Bock: No. I cannot explain any of them. I think that very often they are too finely drawn.

Dr. Keefer: The only reason I mentioned it is that in our experience within the last year or two the prediction of the location of a myocardial lesion from the type of electrocardiographic change has been rather accurate and I think it is a more than academic question. As you follow a series of patients who have coronary occlusion and show electrocardiographic signs through the wards you find that a high proportion of those who do well for a long period of time have posterior infarctions whereas those who have anterior infarctions do very poorly.

CASE 21332

Presentation of Case

First Admission. A sixteen year old native schoolboy entered complaining of diarrhea.

Approximately one year before admission he noticed the onset of more frequent bowel movements and a change from the normal character to that of a watery secretion. At this time there was no blood, mucus or tarry stools and no abdominal pain. Two months later because of the persistence of these symptoms he visited a physician who gave him milk of bismuth and pepsin. This, however, gave no relief. He then began to lose his appetite, tire more easily and for the first time noticed that his skin was gradually becoming pale yellow in color. These symptoms gradually progressed until he was having six to eight bowel movements every day and about three months before entry he noticed for the first time a small quantity of dark red blood in each movement. He visited the Out-Patient Department five weeks before entry where his treatment consisted of bismuth powders, soft diet, liver soup, cod liver oil, tomato juice and red bone marrow. During the month before admission his stools became slightly less watery and very often contained no blood. He felt that he had improved generally, had gained a little weight and had more ambition. He had not been confined to bed and had been attending school fairly regularly. His weight did not change. He recently had a little dyspnea on exertion but no other symptoms.

His father and mother were both living and well. Two sisters were living and well. There was no familial history of tuberculosis or colitis.

His past history was negative except for an attack of painful but not swollen joints two years before entry requiring bedrest for a week.

Physical examination showed a well-developed and well-nourished boy. The skin and mucous membranes were pale. The teeth were normal. The lungs were clear. The heart was slightly enlarged to percussion and palpation. At the

apex there was a blowing systolic and a low pitched rumbling diastolic murmur. The blood pressure was 130/70.

The temperature was 99.6°, the pulse 120. The respirations were 25.

Examination of the urine was negative. Examination of the blood showed a red cell count of 4,800,000, with a hemoglobin of 50 per cent. The white cell count was 14,200, 73 per cent polymorphonuclears. There was marked achromia. Five stool examinations were negative except for slight watery consistency. The guaiacs were negative for the first week. A Hinton test was negative. The serum protein was 6.5 per cent. A dysentery agglutination test was negative. Tuberculin tests up to 1:1000 were negative. Gastric analysis showed a normal amount of free acid. The guaiac was negative.

A barium enema showed complete lack of haustral markings. The rectum was not definitely diminished in size. The cecum showed no spasm. There were no haustral markings and the size of the cecum was that of the descending colon. The terminal ileum showed slight variation from normal. Examination of the chest was essentially negative.

He did fairly well for the first week. He showed no evidence of blood in his stools. His temperature chart was flat. About ten days after admission his stools became more watery and showed definite blood. The guaiacs in his stools remained positive for the next two weeks, although he felt much better. Approximately one month after admission he was discharged improved. He was put on a low residue diet, given one yeast cake three times a day, one half a pound of domestic liver extract daily, and iron and bismuth subcarbonate p.r.n.

Second Admission, six days later.

When he was discharged he had been having only four to six stools daily. After he was home for two days he began to vomit and soon his diarrhea increased markedly, requiring bowel movements every one or two hours at night and about every three hours during the day. Associated with this diarrhea was cramp-like abdominal pain. He lost his appetite and felt very weak.

Physical examination was the same as on his previous admission, except for slight tenderness over the course of the colon, especially in the left lower quadrant.

The temperature was 100.3°, the pulse 103. The respirations were 20.

Examination of his blood showed a red cell count of 7,450,000, with a hemoglobin of 95 per cent. The white cell count was 6,800, 64 per cent polymorphonuclears. The stools were watery, green brown in color and had a four plus guaiac.

Two days after admission an ileostomy and appendectomy were performed. For the following few days the chart was satisfactory and the ileostomy was working well. One week after operation he began to vomit a great deal and became slightly distended. The ileostomy was still draining. Aspiration of the stomach yielded sixty ounces of upper intestinal contents containing occult blood. The abdomen became more distended. He became irrational. His temperature rose to 107.5°, the pulse to 170 and the respirations to 30. He died nine days after operation.

Differential Diagnosis

Dr. William B. Breed: There is very little in the present illness in the way of a differential diagnosis. It would seem that he was well on his way toward idiopathic ulcerative colitis. I think that tuberculous colitis in a child like this is not to be considered very seriously. Of course, one must consider the various parasites. I assume that later in the history we shall investigate the question of parasites, also the question of tuberculin tests, etc. Probably x-rays of the chest and stool examinations follow down the diagnosis of tuberculosis and parasitic disease, but offhand I should think that such efforts were fruitless.

"His past history was negative except for an attack of painful but not swollen joints. . . ." That is of interest because of the question of possible rheumatic fever—merely as an incidental process, however, because this story of colitis is not often associated with rheumatic fever in children. He may have had rheumatic fever. We should like to know what the examination of his heart was prior to his entry and whether any doctor had ever noted any evidence of rheumatic heart disease. There is some evidence here to indicate that this boy has rheumatic heart disease and in view of the enlargement of the heart I think it may turn out that he has. On the other hand, if he had only a severe degree of anemia we might get these findings through the stethoscope. He might have the systolic murmur of course; and one does rarely get a diastolic murmur in severe anemia which clears up with the improvement of the anemia. Our experience in the House of the Good Samaritan is that very many times we get a rumbling diastolic murmur during the acute stage of the disease, even in the presence of true rheumatic heart disease, and later on find that it disappears. Frequently in such a case no stenosis can be demonstrated at autopsy. So, in view of the enlargement I think we have to say he has mild rheumatic heart disease, but I am not prepared to say he will show stenosis of the mitral valve. We get very meek about this question of diastolic murmurs because we have been tripped up too many times in making the diagnosis of mitral stenosis on the basis of a diastolic murmur at the apex and finding later no real stenosis of the valve.

He has hypochromic anemia, secondary in

type, with a rather surprisingly high red cell count. I should like to have that checked because one would rather expect with a hemoglobin of 50 not quite such a high red count even though it is a hypochromic anemia.

DR. BENJAMIN CASTLEMAN: The hemoglobin was repeated a week later and was 60 per cent. Two weeks later the red cell count was 5,400,000, with a hemoglobin of 60 per cent.

DR. BREED: "Tuberculin tests up to 1:1000 were negative." That practically rules out tuberculosis; 1:1000 is a strong dilution.

It does not say anything about examination of the stools and culture for amebae.

DR. CASTLEMAN: They were done and were negative.

DR. BREED: I think this is a perfectly good picture for ulcerative colitis.

DR. CASTLEMAN: I might say, Dr. Breed, that x-ray examination of the heart showed no enlargement.

DR. BREED: And no mitral shape, I take it.

DR. CASTLEMAN: No.

DR. BREED: This diastolic murmur might be a red herring, also the question of enlargement. I am not sure he has rheumatic heart disease at all.

Apparently, then, on the basis of how he was treated, the hospital diagnosis was ulcerative colitis. Of course, the hospital may be wrong.

He came in again after six days. Something must have come up of an acute nature that sent him back into the hospital.

I have not read the history but I imagine he got so much worse that they operated on him. That brings up the question of why they did not operate on him sooner. He was pretty well during his first stay. I think the one temptation with these people is to let them go until they get in such poor condition they are bad risks.

There is remarkably successful treatment of anemia here! His hemoglobin which was 50 per cent is now up to 95 per cent, unless he was dehydrated. I think the smear would be of some value.

DR. CASTLEMAN: He was very ill and dehydrated at the time.

DR. BREED: I do not see how that would make the red cells appear normal as quickly as this. One of these examinations must be faulty.

DR. CASTLEMAN: A week before he left the hospital the red count was 5.4 and the hemoglobin 60. No smear is recorded.

DR. BREED: I see here that they did operate on him.

Did they examine the heart at this admission?

DR. CASTLEMAN: The heart was normal in size. There was a blowing systolic murmur at the apex, transmitted to the axilla.

DR. BREED: Any diastolic murmur?

DR. CASTLEMAN: A_2 was equal to P_2. There was no diastolic murmur heard.

DR. BREED: I do not know whether we can find the exact cause of death. Intestinal obstruction is not indicated. We know that the stomach contents showed upper intestinal fluid. He may have had ileus from toxemia. I think he just died from colitis and operation and I think it is futile to inquire into the exact and distinct cause of death. I should doubt if you find real intestinal obstruction. I am going to say that he did not have rheumatic heart disease. I am assuming that he did not have amebic dysentery and that he died of ulcerative colitis. It is what one would expect in a young person because the younger they are the more severe they are as a rule.

A PHYSICIAN: Was a proctoscopic examination done?

DR. BREED: There is no record of it.

A PHYSICIAN: How about the blood picture?

DR. BREED: I am assuming that he had a secondary anemia due to blood loss and toxemia.

A PHYSICIAN: Do you think it was primary blood disease? I am wondering how much dependence you can put on the record as to the blood picture.

DR. BREED: I am not willing to put very much on it. It contradicts itself. I am going to leave the blood picture out. I think he had secondary anemia. I will take the first report rather than the second one.

Of course, the outlook in a person of this age is very gloomy with or without operation and one cannot look back and say that if he had been operated on earlier he would have survived. But, as I said before, people often hesitate too long in operating on ulcerative colitis. Naturally, it is well to hesitate for a certain length of time to be sure of the diagnosis, because it is very disconcerting to operate by mistake on a case of amebic dysentery or the like.

CLINICAL DIAGNOSES

Ulcerative colitis.
Acute appendicitis.
Intestinal obstruction.

DR. WILLIAM B. BREED'S DIAGNOSES

Idiopathic ulcerative colitis.
Hypochromic secondary anemia.
Ileus?

ANATOMIC DIAGNOSES

Chronic ulcerative colitis.
Peritonitis, generalized, acute.
Appendiceal abscess, retroperitoneal, localized.
Intestinal obstruction, ileum.
Operative wounds: Ileostomy; appendectomy; jejunostomy.
Hydronephrosis, right.
Pulmonary congestion.
Hydrothorax, left.

Pathologic Discussion

Dr. Castleman: He had no rheumatic heart disease. The heart was small and showed no valvular lesions. He was very pale and emaciated, and weighed only 85 pounds. On opening the abdominal cavity it was found filled with slightly turbid hemorrhagic fluid. The surfaces of the intestine were all covered with a fibrinous exudate. There was also a moderate degree of intestinal obstruction in the ileum, produced by a small kink due to adhesions of fibrinous bands. The colon throughout, beginning at the cecum and extending down to the anus, showed numerous ulcerations and in between the ulcerations there were small areas of mucosa that appeared raised, the so-called pseudopolyps, but no true adenomatous polyps at all and no evidence of carcinoma. There were no perforations or fistulae. He had some congestion in his lungs and a little fluid in the pleural cavities but no evidence of pneumonia. The bone marrow was tremendously hyperplastic, a finding which would go well with the hypochromic anemia.

Dr. Breed: What sort of peritonitis was it?

Dr. Castleman: Bacillus coli.

A Physician: How often do these ulcerative colitis cases perforate? As often as amebae?

Dr. Castleman: There is a type of acute ulcerative colitis in which the symptoms are only of two or three weeks' duration before death ensues. This type is much more prone to perforate than the chronic type with remissions. The chronic type on the other hand is more prone to develop strictures and polyps. The Mayo Clinic has recently reviewed 800 cases and found that 2½ per cent of them developed adenocarcinoma[1]. Ten per cent developed true adenomatous polyps, not the pseudopolyps that you ordinarily see, true polyps. We have had only one case of carcinoma associated with chronic ulcerative colitis[2]. In this case there were multiple carcinomata, a fact that suggests that the tumor arose on a previous irritative focus.

A Physician: How do you account for the systolic murmur?

Dr. Breed: I think on the basis of anemia; even the diastolic murmur.

A Physician: His diastolic murmur disappeared but the systolic did not.

Dr. Breed: With nothing else to back up the diagnosis of heart disease a systolic murmur can be thrown out. That is, with no enlargement and no evidence of any heart disease other than the murmur you had better disregard it.

I wonder what the joint pains were two years before. He might have had rheumatic fever. Some have rheumatic fever even at this age without heart disease, but very few, of course, escape without cardiac involvement.

A Physician: Would a proctoscopic examination have cleared up this picture? If there was ulcerative colitis you should see the ulcers quite easily.

Dr. Breed: They felt pretty certain that it was true ulcerative colitis and did not consider anything else after the negative tuberculin test. They did not consider amebic dysentery very seriously. Some people say they can tell the difference between ulcerative colitis and amebic colitis by proctoscopic examination but it is very difficult in some cases. I know of two that were wrongly diagnosed by proctoscopy; amebic dysentery was called ulcerative colitis.

A Physician: Do you ever have diarrhea and constipation in idiopathic colitis?

Dr. Breed: They have spontaneous remissions and during the remission they may be constipated.

A Physician: Supposing that he had not been secondarily infected, what would be the chances of cure?

Dr. Breed: I think not very good because sometimes even with an ileostomy they will go on and have colitis. All you do is short circuit the bowel stream from the colon and let it rest. They do not attempt to close the ileostomy any more. Do you know of any cases where the circuit has been reëstablished and a cure obtained, Dr. Castleman?

Dr. Castleman: I do not think that there have been any in this hospital.

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1. Brust, J. C. M., and Bargen, J. A.: Neoplastic factor in chronic ulcerative colitis. New Eng. J. Med. 210:692, 1934.
2. Case 21081. New Eng. J. Med. 212:350 (Feb. 21) 1935.

The New England
Journal of Medicine

SUCCESSOR TO
THE BOSTON MEDICAL AND SURGICAL JOURNAL

Established in 1828

Published by THE MASSACHUSETTS MEDICAL SOCIETY under the jurisdiction of the

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SUBSCRIPTION TERMS: *$6.00 per year in advance, postage paid for the United States, Canada $7.0½ per year, $8.52 per year for all foreign countries belonging to the Postal Union.*

Material for early publication should be received not later than noon on Saturday. Orders for reprints must be sent to the Journal office, 8 Fenway.

The Journal does not hold itself responsible for statements made by any contributor.

Communications should be addressed to The New England Journal of Medicine, 8 Fenway, Boston, Mass.

"CONTINUING MEDICAL EDUCATION"

UNDER this suggestive caption*, the Vice-President in Charge of University Relations, University of Michigan, describes Michigan's Postgraduate Program for keeping practitioners up to date in their knowledge of the science and of the art of medicine. The problem is stated in a quotation from Osler: "The family doctor, the essential factor in the battle, should be carefully nurtured by our schools and carefully guarded by the public." The responsibility of the public is generally lost sight of, but the participation of the schools has always been regarded as necessary. It is here that the teachers must chiefly be sought and found, but the form and degree of participation have varied in the numerous experiments made in many states. Osler was writing on the "Educational Value of Medical Societies", and it is to the state society that the general practitioner must look for the chief means for solution of the problem, with which he is by himself helpless to deal.

All of these experiments in "continuing medical education" are worthy of close scrutiny and study, for the physician should be a student all his life, but among the growing group the Michigan experiment especially deserves attention. The details need not be specified now: naturally they might be different in Michigan with a state university from what would be appropriate in Massachusetts.

The efforts of the Massachusetts Medical Society have met with encouraging response, but the opportunities have been merely touched. The hands of those responsible for the rather modest program should be upheld, and they should be encouraged by suggestion and helpful criticism.

The possible results of a wise program carried out over a period of years are very great. Already as Dr. Bruce says of Michigan: "There has been a decided improvement in the morale of the medical profession of the state, and evidence of a helpful coöperative attitude of one physician to another stimulated by the class room contacts. In addition there has developed a teaching talent in many well-informed practitioners and specialists which hitherto has not had opportunity to express itself. But possibly more important than all, the standards of social responsibility of the profession have gone forward, as well as those of medical practice, with the evidence of a renewed confidence on the part of the people."

If these results may reasonably be expected, the movement deserves the support of every member of the medical profession and especially of every member of the state society.

*Continuing Medical Education: James D. Bruce, M.D. The American Scholar, Vol. 4, No. 2, Spring 1935.

INDUSTRIAL DISEASE REFEREES

UNDER House Bill 2147, enacted recently, the text of which appears on page 333 of this issue, provision is made for the selection, by the Industrial Accident Board, of impartial physicians who may examine a claimant for compensation, for "injury due to an industrial disease", and "may cause to be made an inspection of the place or places of employment".

The selection of these referees is to be made from a list of registered physicians prepared by the Board of Registration in Medicine. Whether this list shall be the entire list of registered practicing physicians, or a list of those considered suitable by the Registration Board does not appear. The last paragraph of the act provides for a revision of the list on the request of the Industrial Accident Board. Whether this in turn means a revision to delete those who no longer practice and include new registrants, also does not appear. The assumption that discretion lies with the registration

board may be the intention of the framers of the bill. If indicated, the reviewing board may refer the matter back to the referees for further diagnosis.

One may see that the operation of the provisions of this act may be a reasonable resource for the injured workman, if the service rendered by the Industrial Accident Board, the Board of Registration, the Impartial Referees and the Reviewing Board is free from political influences.

Under the operation of this act, if the injured workman, the doctors and the insurance companies all find that the results are satisfactory, it may prove to be a step in the right direction. The results of the operation of this act will be watched with interest.

THE RESPONSIBILITY OF OWNERS OF DOGS

THE Massachusetts Department of Public Health is placing on owners of dogs the responsibility of a large proportion of the almost three hundred cases of rabies in this state during the past year.

About one thousand persons who were bitten by or exposed to these dogs or bitten by stray dogs have had to take antirabic treatment. One untreated child bitten by a stray dog died of rabies.

Rabies is on the increase, with the spread to several sections of the state from the metropolitan area.

Here is a public health opportunity in which doctors may participate by telling the owners of dogs, among their patients, to have the animals immunized. Veterinarians will give the required treatment. Rabies is one of the most horrible diseases, but fortunately is largely preventable.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

SWEET, RICHARD H. M.D. Harvard University Medical School 1926. F.A.C.S. Assistant Surgeon, Massachusetts General Hospital, and Palmer Memorial Hospital, Boston. His subject is "Volvulus of the Cecum. Acute and Chronic with Reports of Eight Cases." Page 287. Address: 205 Beacon Street, Boston.

OVERHOLT, RICHARD H. A.B., M.D. University of Nebraska College of Medicine 1926. F.A.C.S. Instructor in Surgery, University of Pennsylvania. Surgeon, Lahey Clinic, Boston, and in charge of Department of Thoracic Surgery. Thoracic Surgical Consultant to New England Deaconess Hospital, New England Baptist Hospital, Norfolk County Hospital, Bristol County Hospital, and New Hampshire State Sanatorium. Address: 605 Commonwealth Avenue, Boston. Associated with him is

DONCHESS, JOSEPH C. M.D. University of Pittsburgh School of Medicine 1932. Fellow in Surgery, Lahey Clinic. Address: 605 Commonwealth Avenue, Boston, Mass. Their subject is "Subphrenic Abscess." Page 294.

GARREY, WALTER E. B.S., M.D. Harvard University Medical School 1931. Resident, East Surgical Service Section, Massachusetts General Hospital. Address: Massachusetts General Hospital, Boston. Associated with him is

COHN, ROY B. A.B., M.D. Leland Stanford University School of Medicine 1932. House Officer, East Surgical Service, Massachusetts General Hospital. Formerly, Resident in Neurosurgery, Massachusetts General Hospital. Address: Massachusetts General Hospital, Boston. Their subject is "The Use of Sodium Evipal as an Anesthetic for Short Surgical Procedures." Page 301.

SISE, L. F. A.B., M.D. Harvard University Medical School 1901. Anesthetist, Lahey Clinic, and New England Baptist Hospital, Boston. Consulting Anesthetist, New England Deaconess Hospital, Boston. Address: 605 Commonwealth Avenue, Boston. Associated with him are

WOODBRIDGE, P. D. A.B., M.D. Harvard University Medical School 1921. Anesthetist, Lahey Clinic, New England Deaconess Hospital and New England Baptist Hospital. Address: 605 Commonwealth Avenue, Boston. And

EVERSOLE, U. H. A.B., M.D. University of Kansas School of Medicine 1932. Anesthetist, Lahey Clinic, New England Deaconess Hospital and New England Baptist Hospital, Boston. Address: 605 Commonwealth Avenue, Boston. Their subject is "Cyclopropane. A New and Valuable Gas Anesthetic." Page 303.

HOLMES, GEORGE W. M.D. Tufts College Medical School 1906. Roentgenologist, Massachusetts General Hospital. Clinical Professor in Roentgenology, Harvard Medical School. Address: Massachusetts General Hospital, Boston. Associated with him is

HUNTER, FRANCIS T. A.B., M.A., M.D. Harvard University Medical School 1924. Assistant Physician, Massachusetts General Hospital. Address: Massachusetts General Hospital, Boston. Their subject is "The Management of Roentgen Sickness." Page 308.

KAPPIUS, MEINOLPH V. B.Sc., M.D. Harvard University Medical School 1924. Assistant in Obstetrics, Harvard Medical School. Assistant to Out-Patients, Boston Lying-In Hospital, Boston, and Free Hospital for Women, Brookline. His subject is "Vorhees Bag in the Treatment of Placenta Previa." Page 310. Address: 475 Commonwealth Avenue, Boston.

FITCHET, SETH M. A.B., M.D. Harvard University Medical School 1921. B.P.H., F.A.C.S. Visiting Surgeon, Orthopedic Department, Chil-

dren's Hospital. Assistant in Surgery, Massachusetts General Hospital. Associate Surgeon, New England Baptist Hospital. Consulting Surgeon, Josiah B. Thomas Hospital, Peabody, and Massachusetts Eye and Ear Infirmary. Assistant in Orthopedic Courses for Graduates, Harvard Medical School. His subject is "Fracture of the Epiphysis of the Lesser Trochanter of the Femur." Page 313. Address: 319 Longwood Avenue, Boston.

VAN ETTEN, N. B. M.D. Bellevue Hospital Medical College 1890. F.A.C.P. Speaker, House of Delegates of the American Medical Association. Trustee of the Medical Society of the State of New York. President and Medical Director of the Morrisania City Hospital. Chairman of the Medical Board of the Union Hospital of The Bronx. His subject is "Medical Economics." Page 315. Address: 300 East Tremont Avenue, New York, N. Y.

MASSACHUSETTS LEGISLATIVE NOTE

House 2147, as enacted

AN ACT providing for the reference of certain cases under the Workmen's Compensation Act to industrial disease referees.

Chapter one hundred and fifty-two of the General Laws is hereby amended by inserting after section nine A, as appearing in the Tercentenary Edition, the following new section:—

SECTION 9 B. The board of registration in medicine shall as soon as this section takes effect, prepare and transmit to the department a list of registered physicians. In the event of any employee, or in case of his death his legal representative or dependents, making a claim for compensation alleging that his injury is due to an industrial disease, the industrial accident board shall submit the claim to three physicians selected by it from said list, who shall be impartial. Such three physicians shall be known as industrial disease referees. They may make such examinations of the employee and cause to be made such inspections of the place or places of employment as they deem necessary, and shall report their diagnosis to the department. The insurer shall reimburse the department for the fees and other expenses of such referees, subject to the approval of the industrial accident board. The diagnosis shall be made by a majority vote of the referees, and shall be included in the decision of the single member and in the decision of the reviewing board, and such diagnosis shall be binding on the parties. The reviewing board, if a claim for review is filed, may refer the matter back to the industrial disease referees for further diagnosis. The board of registration in medicine from time to time may, and on request of the industrial accident board shall, revise the list of physicians from which industrial referees may be appointed, and shall notify the department of such revision.

MISCELLANY

APPOINTMENTS AT THE BOSTON UNIVERSITY SCHOOL OF MEDICINE

School of medicine promotions—Leroy M. S. Miner, M.D., D.M.D., dean of Harvard dental school, professor of stomatology; Edwin W. Smith, M.D., professor of obstetrics; Burnham S. Walker, Ph.D., M.D., professor of biochemistry; C. Wesley Sewall, M.D., associate professor of obstetrics; Frederick F. Yonkman, Ph.D., associate professor of pharmacology; William C. Boyd, Ph.D., assistant professor of biochemistry; John C. V. Fisher, M.D., assistant professor of obstetrics; Kenneth Christophe, M.D., instructor in orthopedic and fracture surgery; Ensio K. F. Ronka, M.D., instructor in anatomy; Albert J. Plummer, Ph.D., instructor in pharmacology; Frank Barton, M.D., instructor in clinical surgery.

The following appointments were made to the medical school faculty: Richard H. Norton, D.M.D., assistant professor of stomatology; Phillips Boyd, M.D., assistant in anatomy; Welman B. Christie, M.D., assistant in surgery; L. Curtis Foye, M.D., assistant in pediatrics; Thomas R. Mansfield, M.D., assistant in surgery; Anthony Macaluso, M.D., assistant in ophthalmology; Barnett H. Rosenfield, M.D., assistant in gynecology; Carl E. Trapp, M.D., assistant in neurology.

DR. McKHANN VISITS CHINA

Dr. Charles F. McKhann, Assistant Professor of Pediatrics at the Harvard Medical School, has gone to China where he will be Visiting Professor of Pediatrics at the Peiping Union Medical College during the first half of the school year 1935 and 1936. He will return to Boston early in March, 1936.

CORRESPONDENCE

THE CHANGING ORDER IN MEDICAL CONVENTIONS OR A SUGGESTION FOR THE PROGRAMS OF MEDICAL CONVENTIONS

Editor, *New England Journal of Medicine*,

The increasing value of the Scientific Exhibit at the conventions of the American Medical Association has impressed itself upon the attention of every visitor. Two features of the Exhibits in recent years have been prominent:

(1) The demonstration of new methods in diagnosis and treatment.

(2) The extension of knowledge of modern methods and medical concepts through the personal energy and enthusiasm of individual exhibitors.

The program at large medical conventions has become so extensive and diversified that greater correlation of the didactic portions with the exhibits seems necessary. The didactic papers given in various sections would gain tremendously in interest and effectiveness if accompanied in some way by active demonstration of some phase of the subject. The use of moving pictures of slides, which can be stopped at any point for elaboration of some point or the answer-

ing of questions is impossible in a general session but easily done in an exhibit booth. (A special exhibit at the Atlantic City meeting of the A. M. A. had eleven booths with personal demonstrators in each in addition to a lecture room seating sixty-five in which twenty-minute talks were given three times an hour from 9 A.M. till 5 P.M.)

It is suggested that chairmen of various sections could coöperate with the Scientific Exhibit by planning a few papers on their programs which would be accompanied by exhibits in the Scientific Section where demonstrations could be given throughout the convention. This plan would be of special value when a seminar consisting of several papers on one general topic was to be given. Thus, pneumonia, anemia, tuberculosis afford opportunities for demonstrations of clinical laboratory methods in diagnosis, bacteriologic technique, epidemiologic studies and especially of therapeutic procedures.

Yours truly,
H. F. ROOT, M.D.

81 Bay State Road,
Boston, Mass.

ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON PHARMACY AND CHEMISTRY

535 North Dearborn Street, Chicago, Ill.,
July 31, 1935.

Managing Editor, The *New England Journal of Medicine,*

In addition to the articles enumerated in our letter of July 3 the following have been accepted:

Arzol Chemical Company
Mercurochrome Applicators

Sharp & Dohme
Ampules Sodium Cacodylate-Mulford, 2 grains, 1 cc.

U. S. Standard Products Company
Ampul Solution Sodium Cacodylate 0.2 Gm. (3 grains), 1 cc.
Ampul Solution Sodium Cacodylate 0.32 Gm. (5 grains), 1 cc.
Ampul Solution Sodium Cacodylate 0.45 Gm. (7 grains), 1 cc.
Ampul Solution Sodium Cacodylate 0.2 Gm. (3 grains), 5 cc.
Ampul Solution Sodium Cacodylate 0.32 Gm. (5 grains), 5 cc.
Ampul Solution Sodium Cacodylate 0.45 Gm. (7 grains), 5 cc.

The following articles have been accepted for inclusion in the List of Articles and Brands Accepted by the Council But Not Described in N.N.R. (New and Nonofficial Remedies, 1935, p. 445):

U. S. Standard Products Co.
Physiological Solution of Sodium Chloride—U.S.P., 50 cc. bottle
Physiological Solution of Sodium Chloride—U.S.P., 100 cc. bottle

Yours sincerely,
PAUL NICHOLAS LEECH, *Secretary,*
Council on Pharmacy and Chemistry.

RECENT DEATHS

BACON—JONAS EDWARD BACON, M.D., of 92 Tilton Avenue, Brockton, Massachusetts, died July 31, 1935. Dr. Bacon was born in Woburn in 1853, and after graduating from Harvard College in 1875 and from the Harvard Medical School in 1878, settled in Brockton where he was soon chosen as town physician. Later, after Brockton had become a city, he served as City Physician through three or more terms. At one time he served on the Board of Health where he won recognition as an efficient executive. He was influential in the development of the City Hospital and in other civic enterprises. During the World War he served on the Exemption Board.

He was a Fellow of the Massachusetts Medical Society and the American Medical Association and was affiliated with the Masonic Order.

WIGHT — FREEMAN CLARK WIGHT, M.D., of Millis, Massachusetts, died suddenly in Boston, August 4, 1935. He was born in 1872, the son of Freeman Wight and Pernella E. Wight of Boston.

He graduated from the Tufts College Medical School in 1921, studied abroad, and joined the Massachusetts Medical Society in 1922.

Dr. Wight is survived by his widow, Mattie S. Wight, and a brother, Robert F. Wight, living in Brookline.

LARRABEE—FRANK WALTON LARRABEE, M.D., of 556 Cambridge Street, Allston, Massachusetts, died at his home August 8, 1935, after an extended illness.

Dr. Larrabee was born at Macon, Missouri, in 1870 and moved with his parents to Auburn, Maine, six years later. After graduating from the public schools of Auburn, he entered Boston College, graduating four years later and from the Dartmouth Medical School in 1897. His early practice was conducted in Auburn, Maine, Block Island, R. I., and Warren, Maine, before settling in Allston. He took postgraduate courses at Johns Hopkins and Harvard Medical Schools.

He was commended by the U. S. Volunteer Life Savings Corps for heroic work at the time of the disaster to the Larchmont off Block Island. He was affiliated with the Masonic and Odd Fellows organizations.

His widow, Mrs. Ila (Smith) Larrabee, one sister and a brother, survive him.

HALE—WILLIS LE BARON HALE, M.D., of North Attleboro, Massachusetts, died suddenly August 11, 1935. He was born in 1876 and graduated in medicine from the Jefferson Medical College in 1901. He

settled in Attleboro in 1910 and practiced there until his death, with the exception of war service. He had served as school physician and physical director of high school athletic activities.

NOTICES

REMOVAL

M. L. KRAFT, M.D., announces the removal of his office to 93 Washington Avenue, Chelsea, Mass.

A VACANCY FOR A PHYSICIAN

An opening for a country practice exists in Massachusetts. Call at the office of the *New England Journal of Medicine.*

UNITED STATES CIVIL SERVICE EXAMINATIONS

The United States Civil Service Commission has announced open competitive examinations as follows:

Public Health Specialists

Applications for a number of specialist positions in the U. S. Public Health Service, Treasury Department, must be on file with the U. S. Civil Service Commission, Washington, D. C., not later than September 9, 1935. These positions include several grades of bacteriologist, cytologist, epidemiologist, and mycologist (medical) positions, and the position of senior pathologist (medical).

Area Medical Director, $5,600 a Year
Indian Service, Department of the Interior

Applications must be on file with the United States Civil Service Commission at Washington, D. C., not later than August 26, 1935.

The United States Civil Service Commission announces an open competitive examination for the position named above. Vacancies in this position and in positions requiring similar qualifications will be filled from this examination, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer, or promotion. The salary named above is subject to a deduction of 3½ per cent toward a retirement annuity, and to a further deduction of $400 for Government quarters when furnished.

REPORT AND NOTICE OF MEETINGS

THE SOUTHEASTERN MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH

The Southeastern Massachusetts Association of Boards of Health held its annual meeting in the Town Hall at Marion on Wednesday, July 31, some sixty persons being in attendance. After a business meeting, which included the reading of reports of the secretary and treasurer, the election of officers was in order, resulting in the following list for the coming year:

President, Dr. T. L. Swift, Falmouth; Vice-Presidents, Dr. G. E. Ward, Orleans, and Joseph Christy, Dartmouth; Secretary-Treasurer, George F. Crocker, Marston's Mills; Executive Committee, Dr. R. P. MacKnight, New Bedford, Dr. W. O. Hewitt, Attleboro and W. F. Delano, Fairhaven.

In a brief address of greetings, Walter K. Perry of the Marion committee, sketched the admirable work in health and public sanitation effected by the town. Some forty years ago an improvement association was formed, the first work of which was a campaign against the fly, which included the screening of cellars and proper care of manure heaps. Next, work was toward the elimination of the mosquito. In this, more than $45,000 has been expended, and the territory covered includes breeding places in neighboring towns. Marion has expended $165,000 for a sewer system, the sewage being pumped to a basin far removed from the shore, and there treated, so that there is no pollution of coastal waters. The water system, which has a longer mileage than the streets, since it supplies cottages at the shore, cost about $300,000. Even with these costs the town indebtedness today is only $100,000. There are two full-time nurses serving the town.

The speaker for the occasion was Hermann C. Lythgoe, S. B., Director of the Division of Food and Drugs, Massachusetts Department of Public Health, who presented the important points of recent legislation affecting the sale of mixtures containing alcohol, of narcotics, the licensing of the manufacture and sale of soft drinks, and the inspection by the local health officers of dairies furnishing milk to towns.

Following the formal meeting the company adjourned to the Old Stone House, where a collation was served.

MIDDLESEX SOUTH DISTRICT MEDICAL SOCIETY

The Mid-Summer meeting will be held Wednesday, August 21, 1935. The undersigned will act as host. Among the attractions are the following: An opportunity for an afternoon in Bedford. Any "New Dealers" will be very welcome regardless of their rash ideas but can expect to have some injections of horse and dog sense and scents.

My unpretentious ranch has been in existence since 1695 and is located on the North Road in Bedford about one mile beyond the centre of the village, and four miles north of Lexington.

There is an opportunity for any number to swim in the pool, and for a limited number to ride horseback through the woods. They should come

prepared for riding and let the undersigned know their intentions so that plans can be made for suitable mounts. There is unrivaled opportunity for hiking through the primeval woods. There is a suitable field for ball games and an opportunity for quoits and archery.

Arrangements can be made for any number to play golf at the Paul Revere Golf Club which is but a short distance from the Farm. It is quite essential to notify the undersigned in advance as to the number who would care to spend the afternoon golfing.

There will be a clambake on one of the hills at about 12:30 or 1 o'clock.

When arriving in Bedford you continue north on Route No. 4, the main road going toward the mountains, for about one mile. When coming from the south or east of Lexington, you turn to the right at the Battle Green on Bedford Street and continue straight to the centre of Bedford. If coming from the northeast, you follow Route 62 directly to Bedford Centre. If coming from the north or west you can follow Route No. 4 from Chelmsford Centre directly to the Farm or Route No. 2 or No. 2A to Concord and then No. 62 to Bedford.

If Wednesday, August 21 should prove to be rainy or unpleasant, the meeting will be postponed until the following Wednesday.

In order that the necessary provisions may be made, please notify the undersigned promptly.

G. V. BUEHLER.

SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, AUGUST 19, 1935

Wednesday, August 21—

†12 M. Clinico-Pathological Conference. Children's Hospital.

Saturday, August 24—

*10-12. Staff rounds at the Peter Bent Brigham Hospital.

*Open to the medical profession.
†Open to Fellows of the Massachusetts Medical Society.

August 29 - September 5—Latin American Congress of Physical Therapy, X-Ray and Radium. For information address Dr. Madge C. L. McGuiness, 1211 Madison Avenue, New York City.

September 5, 6, 7—American Congress of Physical Therapy will meet at the Hotel Kansas Citian, Kansas City, Missouri. Program and circular of information may be secured by addressing: American Congress of Physical Therapy, 30 North Michigan Avenue, Chicago, Illinois.

September 17, 18, 19—Eleventh Clinical Congress of the Connecticut State Medical Society. For details address Dr. Creighton Barker, 129 Whitney Avenue, New Haven Conn.

October 7-10—American Public Health Association will meet in Milwaukee, Wisconsin. For information address the American Public Health Association, 50 West 50th Street, New York City.

October 21 - November 2—1935 Graduate Fortnight of the New York Academy of Medicine. See page 898, issue of May 9.

October 28 - November 1—The Twenty-Fifth Clinical Congress of the American College of Surgeons. See page 1065, issue of May 30.

DISTRICT MEDICAL SOCIETY

MIDDLESEX SOUTH DISTRICT MEDICAL SOCIETY

August 21—See page 335.

BOOKS RECEIVED FOR REVIEW

A Textbook of Clinical Neurology with an Introduction to the History of Neurology. Third Edition. Reset. Israel S. Wechsler. 826 pp. Philadelphia and London: W. B. Saunders Company. Cloth, $7.00 net.

Lactobacillus Acidophilus and its Therapeutic Application. Leo F. Rettger, Maurice N. Levy, Louis Weinstein and James E. Weiss. 203 pp. New Haven: Yale University Press. $2.50.

Diet and Physical Efficiency. The influence of frequency of meals upon physical efficiency and industrial productivity. Howard W. Haggard and Leon A. Greenberg. 180 pp. New Haven: Yale University Press. $3.00.

Methods and Materials of Health Education. Jesse Feiring Williams and Fannie B. Shaw. 331 pp. New York: Thomas Nelson & Sons.

National Medical Monographs. Abnormal Arterial Tension. Edward J. Stieglitz. Edited by Morris Fishbein. 261 pp. New York: National Medical Book Company, Inc. $4.00.

The Spleen and Resistance. David Perla and Jessie Marmorston. 170 pp. Baltimore: The Williams & Wilkins Company. $2.00.

Six Conférences de Physiologie. Léon Binet. 73 pp. Paris: Masson et Cie. 12 fr. Leçons de Physiologie Medico-Chirurgicale. Léon Binet. 244 pp. Paris: Masson et Cie. 40 fr.

Docteur Carlos J. Finlay. Son Centenaire 1933. Sa Decouverte 1881. Francisco Dominguez. 302 pp. Paris: Librairie Louis Arnette.

Bernardo de Galvez in Louisiana. 1776-1783. John Walton Caughey. 290 pp. California: University of California Press.

Thermal Processes for Canned Marine Products. G. W. Lang. 182 pp. California: University of California Press.

Traitement des Fractures et Luxations des Membres. Jacques Leveuf, Charles Girode et Raoul-Charles Monod. 447 pp. Paris: Masson et Cie. 50 fr.

National Medical Monographs. The Management of Colitis. J. Arnold Bargen. 234 pp. New York: National Medical Book Company, Inc.

National Medical Monographs. Diseases of the Chest. J. Arthur Myers. 285 pp. New York: National Medical Book Company, Inc.

National Medical Monographs. Obstetrics for the General Practitioner. J. P. Greenhill. 304 pp. New York: National Medical Book Company, Inc.

Lilly Research Laboratories, Dedication. Indianapolis: Eli Lilly & Company.

Midwifery. By ten teachers under the direction of Clifford White. Edited by Comyns Berkeley, J. S. Fairbairn and Clifford White. Fifth Edition. 740 pp. New York: William Wood & Company. $6.00.

The Medicine-Man of the American Indian and His Cultural Background. William Thomas Corlett. 369 pp. Springfield and Baltimore: Charles C Thomas. $5.00.

A Bibliography of Two Oxford Physiologists, Richard Lower 1631-1691, John Mayow 1643-1679. John F. Fulton. 62 pp. New Haven: Yale University Press.

Traité de Thérapeutique. A. Theohari. Tomes I et II. 1307 pp. Paris: Masson et Cie. 125 fr.

New and Supplementary Facts and Figures about Tuberculosis. Jessamine S. Whitney. 46 pp. New York: National Tuberculosis Association. $.50.

The Doctor and the Public. A study of the sociology, economics, ethics, and philosophy of medicine, based on medical history. James Peter Warbasse. 572 pp. New York: Paul B. Hoeber, Inc.

A Synopsis of Regional Anatomy. T. B. Johnston. Third Edition. 460 pp. Philadelphia: Lea & Febiger. $4.50.

National Medical Monographs. Commoner Diseases of the Skin. S. William Becker. 283 pp. New York: National Medical Book Company, Inc.

National Medical Monographs. Industrial Medicine. W. Irving Clark and Philip Drinker. 262 pp. New York: National Medical Book Company, Inc.

Gynecological and Obstetrical Tuberculosis. Edwin M. Jameson. 256 pp. Philadelphia: Lea & Febiger. $3.50.

A Record Book for Tuberculosis Patients. Lawrason Brown. New York: National Tuberculosis Association. $.15.

The Theory and Practice of Anaesthesia. M. D. Nosworthy. 223 pp. London: Hutchinson Scientific. 12/6 net.

The Medical Man and the Witch During the Renaissance. Gregory Zilboorg. 215 pp. Baltimore: The Johns Hopkins Press. $2.50.

Living Along With Heart Disease. Louis Levin. 126 pp. New York: The Macmillan Company. $1.50.

Annual Reprint of the Reports of the Council on Pharmacy and Chemistry of the American Medical Association for 1934, with the comments that have appeared in the Journal. 135 pp. Chicago: American Medical Association.

New and Nonofficial Remedies, 1935. Containing descriptions of the articles which stand accepted by the Council on Pharmacy and Chemistry of the American Medical Association on January 1, 1935. 510 pp. Chicago: American Medical Association.

Diet Control. A system of eleven hundred diets for the prescription of diabetic, anti-obesity and measured diets in general. George E. Anderson and Paul C. Eschweiler. New York City: Gallo & Ackerman, Inc.

Arthritis and Rheumatoid Conditions. Their nature and treatment. Ralph Pemberton. Second Edition. 455 pp. Philadelphia: Lea & Febiger. $5.50.

Oxford Medical Publications. Gastritis and its Consequences. Knud Faber. 119 pp. London: Oxford University Press. $3.00.

1000 Questions and Answers on T. B. Edited by Fred H. Heise. 232 pp. New York City: National Tuberculosis Association.

Consultations de Cardiologie. George Marchal. 227 pp. Paris: Masson et Cie. 25 fr.

Les Acquisitions Nouvelles de L'Endocrinologie. R. Rivoire. 305 pp. Paris: Masson et Cie. 36 fr.

The American Illustrated Medical Dictionary. A complete dictionary of the terms used in medicine, surgery, dentistry, pharmacy, chemistry, nursing, veterinary science, biology, medical biography, etc., with the pronunciation, derivation and definition. W. A. Newman Dorland. Seventeenth Edition. 1573 pp. Philadelphia and London: W. B. Saunders Company. $7.00.

BOOK REVIEWS

Diseases of the Skin. Richard L. Sutton and Richard L. Sutton, Jr. Ninth edition. 1433 pp. St. Louis: The C. V. Mosby Company. $12.50.

This standard textbook of dermatology has been thoroughly revised and brought up to date. In this edition the senior Dr. Sutton has included his son as co-author, although the latter has collaborated with him in previous editions. The literature since the last edition has been completely covered and twenty-eight new dermatological conditions have been included in this edition. The 1310 illustrations cover the specialty extremely well and aid greatly in diagnosis. It is one of the best pictorial exhibits in any textbook on cutaneous diseases. Included also are many photomicrographs, well chosen and excellent in quality.

The section on syphilis has been revised and expanded to eighty-seven pages. The text is limited by the large number of excellent photographs and there is an excellent bibliography.

In general there are many references to all conditions for the student seeking further information. Individual methods of treatment are stressed, although reference is made to other therapeutic methods. This book can be recommended to student and practitioner alike as a thoroughly excellent source of information on cutaneous disease.

Maladies Infectieuses. A. Lemierre. 406 pp. Paris: Masson et Cie. 60 fr.

This book which strikingly reminds one of The Clinics of North America, is an excellent presentation of a wide variety of disorders of infectious origin. Since the work is essentially of a monographic nature, the diseases discussed are those usually not treated at any great length in the usual text on infectious diseases. For example, instances of benign tetanus, undulant fever, acute infectious nephritis, typhus, the various forms of meningitis and amebic abscess are among those described and discussed. Each case is taken up at length and its salient features presented in such fashion that there should be no question as to the possibility of its retention. Although exception may perhaps be taken to the title, "diphtheritic nephritis", heading the chapter dealing with this particular complication of diphtheria, this minor point should be disregarded in evaluating the work as a whole. It is recommended not only to physicians and students especially interested in the infectious diseases but to the general practitioner as well.

Sedgwick's Principles of Sanitary Science and Public Health. Rewritten and enlarged by Samuel C. Prescott and Murray P. Horwood. 654 pp. New York: The Macmillan Company. $4.25.

A generation ago and more Professor Sedgwick of the Massachusetts Institute of Technology was an inspiring force in awakening the public to a realization of the economic importance of the prevention of disease. His influence was chiefly due to his attractive and persuasive personality, but to some extent also to his book published in 1901, The Principles of Sanitary Science and Public Health.

This book long since out of date and undependable, Professors Prescott and Horwood have undertaken to rewrite to serve primarily as a textbook for "students in science or engineering interested in sanitary science and public health," preserving Professor Sedgwick's form of presentation and changing the substance as has appeared necessary to them in the light of better knowledge and wider practical experience.

The present edition has 600 pages. The subjects treated are presented in twenty-eight chapters, beginning with a consideration of "Health, Old Age and Disease," the Etiology or Causes of Disease. "Ancient and Modern Theories," "The Rise and Influence of Bacteriology," and "Sanitary Aspects of the Struggle for Existence; Factors Affecting Survival," and ending with a chapter on "Organization for Public Health Administration in the United States."

Among the other chapter headings are "Refuse Collection and Disposal," "The Protection and Purification of Public Water Supplies," "Milk Supplies and the Public Health."

Where the phenomena of life are considered as in the introductory chapters and that relating to "Nutrition on the Public Health," a professorial physician who has been bedeviled by a clinical experience with the biological vagaries and assimilative idiosyncrasies of real human beings will find that the authors have made biological premises too simple in order to make their conclusions more positive, but on the whole the book is not so dogmatic as those usually written by professorial teachers for the instruction of students.

The book contains a large amount of practical information and presents effectively and without prejudice apparently inconsistent correlated observations. For these reasons the omission now and then in subjects treated of facts of eminently practical importance become all the more noticeable. Failure to mention the presence of grease as an obstacle to the practical utilization of raw sewage as a fertilizer and to refer to the effect of refrigeration on trichina and tape worm cysts may be cited as two instances.

An example of the authors' way of summing up essentials is the following:

"For among all the vehicles of disease there is perhaps none more potentially dangerous to man than infected milk." The chapters on "Air in Relation to Health and Comfort," on "The Relationship of Housing to Health," and on "Public Health Aspects of Tuberculosis" are to be commended as a refreshingly sensible appraisal of present knowledge regarding these subjects.

Doubtless the information contained in the book might have been condensed into fewer pages, but its verbosity is of the kind which makes it entertaining reading.

Mouth Infection. Clinical histories. Oliver T. Osborne. 119 pp. New Haven: The Printing-Office of the Yale University Press. $2.00.

Dr. Osborne's book of 120 pages is divided into three parts. The first part deals with infections of the teeth and gums; the second, with tonsil infection; and the third, with Vincent's infection, the tongue, adenoids, growths and the toothbrush.

In the first part, the author gives a brief clinical story of mouth infection in which he deplores the indifference of most physicians to this phase of the practice of medicine. He classifies the physical disturbances arising from mouth infection into seven groups, among which are included heart, arthritic and eye conditions. A series of clinical histories are given in a condensed form, usually of only three or four lines.

The same procedure obtains with respect to Part Two, on tonsil infection. The subjects of Part Three are given quite cursory treatment.

As an outline of the general subject, this book may serve a useful purpose. Those seeking only an introduction to the study of the various factors associated with mouth infections, or those who want suggested to them clues to be followed up, will find material in this volume which may intrigue them and perhaps stimulate them to explore further into the subject.

The utmost condensation of the subject matter could only result in these restrictions to the book's usefulness.

Alcohol and Anaesthesia. W. Burridge. 65 pp. London: Williams & Norgate Ltd. 2/6.

"Alcohol and Anaesthesia" is a monograph embodying the ideas of the author as to the mechanism by which alcohol affects tissues and that by which anesthesia is produced. Burridge employs the new principles that central neurones are rhythmically active structures which possess two sources of potential for their energy manifestations, and that the physiological basis of an idea is a group of nerve cells rhythmically active in unison. He argues that we are wrong in stating that alcohol is either a stimulant or a depressant, and deduces from experiments that it is both at the same time.

We find his argument difficult to follow and his recorded experiment lacking in definite data. With his conclusions that some people may use alcohol with benefit while others ought never to use it at all, there would seem to be small ground for disagreement.